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# Transfer students in STEM majors: Gender differences in the socialization factors that influence academic and social adjustment

Dimitra Lynette Jackson  
*Iowa State University*

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**Transfer students in STEM majors:  
Gender differences in the socialization factors that influence  
academic and social adjustment**

by

**Dimitra Lynette Jackson**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of  
**DOCTOR OF PHILOSOPHY**

Major: Education (Educational Leadership)

Program of Study Committee:  
Frankie Santos Laanan, Major Professor  
Larry Ebbers  
Patricia Leigh  
Lori Patton  
Daniel Robinson

Iowa State University

Ames, Iowa

2010

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## DEDICATION

This work is dedicated to all of the community college transfer students. Your experiences are valued. This work is also dedicated to Candice Batts, who unexpectedly passed away in 2008 before completing her doctoral degree in the Department of Agricultural and Biosystems Engineering at Iowa State University. You are remembered. Lastly, this work is also dedicated to my Aunt Marie Doss. You were one of my biggest supporters and constantly reminded me that the sky is the limit. I love you and miss you more than words can express.

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From my years in graduate school, there is one thing I know for sure: Where God guides, he provides! Don't be afraid to give yourself away so that he can use you! Amen for that!

## ABSTRACT

The purposes of this study were (a) to examine the socialization factors of community college transfer students in Science, Technology, Engineering and Mathematics (STEM); (b) to examine the socialization factors that impact the academic and social adjustment of community college transfer students in STEM majors; and (c) to understand how female community college transfer students describe their overall socialization experiences in STEM majors. A survey was used to collect data concerning the background characteristics as well as the community college and university experiences of transfer students. A purposive sample of female community college transfer students were interviewed to gather information about their overall socialization experiences.

The researcher employed a hypothetical conceptual framework of undergraduate socialization for community college transfer students based on Weidman's (1987) conceptual framework of undergraduate socialization. The hypothesized model was used to examine how selected variables—background characteristics, community college experiences, and university experiences—impacted the academic and social adjustment among community college transfer students. Quantitative analysis, including descriptive statistics, independent samples *t* test, and hierarchical multiple regression, as well as qualitative analysis, including narrative inquiry, were used to analyze the data.

Two hierarchical multiple regression models were used to examine the background characteristics and the community college and university variables that predict academic and social adjustment. The results of this study suggest that the background characteristics, including gender; community college experiences, including transfer semester hours, experience with faculty and transfer process; as well as university experiences that include negative general perception of transfer students, impacted the academic adjustment of community college transfer students.

Similarly, a second hierarchical multiple regression model was used to examine the background characteristics and community and university variables that predict social adjustment. The results of this study suggest that the background characteristics parental household income level;

community college experiences: academic advising, course learning; and university experiences: financial influential reasons for attending ISU and negative general perception of transfer students impacted the social adjustment of community college transfer students in STEM.

Additionally, qualitative data, which focused on five female community college transfer students, highlight the role of parents, faculty, community colleges, and universities in the academic and social adjustment of community college transfer students in STEM majors. The study should be replicated in other research universities with a large transfer student population. In addition, it is imperative that policymakers and community college and university faculty and staff understand the socialization of transfer students to ensure the institutional environments are conducive to successful transfer and adjustment.

## CHAPTER 1. INTRODUCTION

*An understanding of the socialization process is vital to all persons involved in postsecondary education, for it is the socialization process that allows education to achieve its goals.*

Ann Kieffer Bragg

For most of the 20<sup>th</sup> century, the United States has been the world leader in the global science, technology, engineering, and mathematics (STEM) enterprise and has had the reputation of having the most educated workforce in the world. However, other nations are catching up and are ready to challenge this economic strength (National Governors Association, 2007). Additionally, many United States (U.S.) jobs are being outsourced to other countries. Among the many jobs are those with U.S. airlines, which “currently outsource portions of their aircraft maintenance to China and El Salvador” (Committee on Prospering in the Global Economy of the 21st Century, 2005, p. 14). If current trends continue, “by 2010, more than 90% of all scientists and engineers will be living in Asia” (Jones, 2008, p. 3). The outlook on the workforce produces not only a concern, but an urgent need to prepare more individuals in science and math to respond to the increase of occupations requiring competence in the areas of math and science. The U.S. Department of Labor projected that by 2014 “15 of the 20 fastest growing occupations [will] require significant science or mathematics training to successfully compete for a job” (Jones, p. 2). Moreover, the U.S. Bureau of Labor Statistics showed that between 2006 and 2016 professional information technology (IT) jobs will increase 24% (Jones). In order for the United States to continue to recruit domestically for individuals to meet the needs of the nation for scientists and engineers, the nation needs 400,000 new graduates in STEM fields by 2015 (Jones). However, even with the demand for solid backgrounds in STEM, these

majors are still going untouched by more and more students (Jones). The lack of individuals pursuing math- and science-related fields is an area of concern and one that must be addressed in order to readily meet the urgent needs of the nation. If the current trend of students pursuing non-STEM related degrees and careers continues, “the U.S. will find it difficult to compete in the global economy” (Jones, p. 3). Further, the United States will not be able to meet its future workforce needs. Although increasing the number of all individuals in STEM areas is essential to the future of the economy, the particular increase in the number of females pursuing STEM fields is also of great importance. The increase of the representation of females will provide a “diversity of perspectives in the search for knowledge and solutions to human problems” and will aid in “the ability to see questions and answers from many perspectives [which] will help make scientific explanations more robust and complete” (Blickenstaff, 2005, p. 383).

According to the Committee on Prospering in the Global Economy of the 21st Century (2005), “Higher education has been central to the strength of the U.S. economy over the last half century” (p. 368). The history of women in STEM is one that has been referred to as a “leaky pipeline,” which leaks or loses students at various stages (Blickenstaff, 2005). These stages range from students who change their minds regarding STEM areas while applying to colleges and universities, to students who pursue an undergraduate journey in a STEM area and switch majors before graduating, to those who actually obtain an undergraduate degree in a STEM area and pursue a career in another field (Blickenstaff). Although women are pursuing college degrees and comprise more than half of college graduates, they still remain an untapped resource in STEM areas. Careful exploration reveals a much smaller proportion of women than men pursuing careers in STEM. In a 2003



report, the National Science Foundation (NSF) found that in 1998 women made up only 47% of those earning mathematics degrees, 46% of chemistry degrees, 43% of agricultural science degrees, 38% of earth science degrees, 33% of chemical engineering degrees, and 27% of computer science degrees. Additionally, women constituted less than 20% of those earning bachelor's degrees in mechanical engineering, electrical engineering, aerospace engineering, and physics (NSF, 2003). In 2004, women accounted for only 22% of engineering graduate students and 27% of computer science graduate students (NSF, 2007).

Even in instances where women are performing and attaining baccalaureate degrees in STEM areas at a rate comparable to their male counterparts (Stolte-Heiskanen, Acar, Ananieva, & Gaudart, 1991), the undergraduate years and experiences remain vital decision-making points when a student is likely to decide not to pursue a science career path (Rayman & Brent, 1995). Several studies have been conducted to understand the disparities that exist between women and men in STEM. Within the literature are many strands of inquiry. One study highlighted gender differences in physical strength, height, access to STEM-related activities and careers, and potential earning power (Linn & Hyde, 1989). Another study, which took into account academic performance measured by grade point average (GPA), found no difference in performance (Brainard & Carlin, 1998). Attitudes toward science were explored by Weinburgh (1995), who found a relatively small effect favoring men's attitudes toward science. These discrepancies and different methods of exploration lead one to wonder why more women are not pursuing rewarding degrees in STEM fields.

### Statement of the Problem

An abundance of literature exists regarding the underrepresentation of individuals, more specifically women, in STEM fields. However, this underrepresentation of women in

STEM continues to be a concern even with the increase of women obtaining baccalaureate degrees. Although women currently account for at least half of the baccalaureate degrees awarded in most industrialized countries, they continue to be significantly underrepresented in science and technology (NSF, 1994; Stolte-Heiskanen et al., 1991). The factors that remove women from the STEM pipeline are complex and consist of cumulative effects of many separate but related factors that require a multifaceted solution (Blickenstaff, 2005). It is essential that the community college and university environments be examined to clearly understand the socialization factors that hinder or enhance the pursuit of STEM bachelor majors for female transfer students. The loss of talented people and role models for society and the next generation due to the limited number of women pursuing degrees in STEM areas is of huge concern. Increasing the participation of women in STEM areas involves a change in all levels of society.

Community colleges have been recognized as one of the leading institutions assisting in increasing the number individuals pursuing bachelor degrees in STEM areas (Berger & Malaney, 2003). President Obama, perhaps the most ardent supporter of community colleges, has recognized the need to increase the readiness of America's workforce. Additionally, the president is looking to community colleges to assist in fulfilling the goal of the United States having the highest proportion of college graduates in the world by 2020. The president has called on community colleges to produce 5 million more graduates by 2020. In addition to this recognition, President Obama has made a commitment to spend \$12 billion over 10 years to improve programs, courses, and facilities at 2-year institutions (Fuller, 2010). Although community colleges are being recognized as pathways for preparing individuals to pursue baccalaureate degrees in STEM areas at 4-year universities and colleges (Starobin & Laanan,

2005), little research has been conducted that focuses on the socialization factors of women at community colleges and how this socialization influences academic and social transfer adjustment in STEM areas (A. K. Bragg, 1976). The majority of the literature on transfer, however, focuses on GPA and quantitative measures of academic performance “as a proxy for integration” and “almost none of it has been conducted on students once they transfer to another institution” (Townsend & Wilson, 2006, p. 441). A closer examination of the socialization factors within the community college and university environments will add to the body of knowledge on female transfer students in STEM majors and academic factors that impact the adjustment process.

### Purpose of the Study

Community colleges have been identified as avenues for fostering STEM aspirations among bachelor degree-seeking individuals, especially among women and other underrepresented populations (Berger & Malaney, 2003). Consequently, how does the socialization for female transfer students in STEM compare to their male counterparts in relation to academic and social adjustment at Iowa State University (ISU)? How do female students describe their socialization experiences in STEM fields? This study first seeks to describe and understand the community college academic preparation and the community college and university socialization experiences of community college transfer students in STEM majors. Additionally, the purpose of this study is to understand the factors that predict successful academic and social adjustment for community college transfer students. Moreover, this study seeks to understand how female community college transfer students in STEM majors describe their overall socialization.

Most of the literature and research on socialization has been conducted on the professional and graduate level (A. K. Bragg, 1976) and includes research on the socialization of doctoral students (Gardner, 2008; Weidman & Stein, 2003) and faculty socialization (Leslie, Swiren, & Flexner, 1977). Tinto (1998) drew attention to the importance of academic and social integration, stating that community college students who are integrated into the social and academic life of colleges (i.e., positive interaction and relationships with faculty and peers) will be more successful and the likelihood of retention will be increased. Additional studies have concurred with this thought on environmental influences (formal and informal student–faculty interaction) among students, more specifically women, by stating that self-confidence in students is greatly affected by this type of formal and informal student–faculty interaction (Santiago & Einarson, 1998; Seymour, 2005). This study further seeks to examine the community college and university socialization experiences of female community college transfer students in STEM areas. The main focus of this study will highlight one segment of this pathway: the transition of transfer students pursuing STEM degrees from community colleges to 4-year universities. Student transition, persistence, and retention are common topics throughout the literature in higher education (Herzig, 2004; Tinto, 1993). In this study, the impact of the background characteristics, community college academic preparation, and the community college and university classroom environments of community college transfer students in STEM are examined. The information obtained as a result of this study will be beneficial to professionals at both 2- and 4-year institutions in understanding avenues for increasing the representation of community college transfer students, specifically women, in nontraditional academic and career areas such as STEM.

The understanding of the socialization among community college transfer students is important for three main reasons. First, the enrollment at community colleges is greater for women than for men (Starobin, 2004). Second, the undergraduate education stage is acknowledged to be the “latest point” for students to enter into a science or engineering field (Xie & Shauman, 1997). Third, this stage (undergraduate education) is central when attempting to understand and influence gender imbalances in science and engineering (Sonnert, Fox, & Adkins, 2007). Examining the academic environmental factors, which have proven to be essential to the success of community college students (Thompson, 2001), will add to the body of knowledge on women in STEM.

### Research Questions

This study seeks to examine the socialization factors of transfer students in STEM and factors that influence successful academic and social adjustment for students in STEM majors at ISU. By answering the following quantitative (questions 1–4) and qualitative (question 5) research questions, this study attempts to generate additional knowledge designed to close the gender gap among students pursuing STEM majors.

1. What are the background characteristics of Iowa community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?
2. What are the community college and university experiences of ISU community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?
3. Are there statistically significant differences in the community college and university experiences by gender?

4. What background characteristics and community college and ISU experiences predict social and academic adjustment for community college transfer students in STEM majors at ISU?
5. How do female community college transfer students describe their overall socialization experiences in STEM majors?

### Methodology

A quantitative approach using survey research was employed to examine the research questions associated with this study. Descriptive and inferential statistics were used to examine the background characteristics, community college experiences, and university experiences of community college transfer students. Two hierarchical sequential regression models were employed to examine factors that predict academic and social adjustment among Iowa community college transfer students in STEM majors. These two models were used to study individual and multiple factor relations with the two dependent variables: academic adjustment and social adjustment.

Additionally, this study sought to understand how female community college transfer students describe their overall socialization experiences. A qualitative component consisting of individual semistructured interviews was included to explore how female students describe these experiences. Social constructionists seek to explain how individuals interpret and make meaning of their socialization experiences (Crotty, 1998). In this study, I sought to understand factors that enable successful socialization for all Iowa community college transfer students in STEM majors and also to understand how female community college transfer students describe their overall socialization experiences in STEM majors.

### Theoretical Frameworks: Theory of Student Involvement and Theory of Socialization

This study employs two theoretical frameworks. Astin's (1984) theory of involvement and Weidman's (1987) theory of undergraduate socialization are used to explore the experiences of community college transfer students in STEM majors. Astin's (1984) theory of involvement is relevant for this study in that it highlights the level of involvement that students exert in their learning experience. Although Astin (1984) intended for involvement to be behavioral in meaning, this study expands on his theory, exploring the manner in which female community college students describe their overall involvement and socialization experiences.

Socialization is an interactive process by which students learn the behavioral norms of an environment. Weidman (1987) asserted that "in terms of socialization, the more fully integrated an individual is into a group, the greater is that group's capacity for assuring a reasonable high level of normative compliance among members" (p. 9). Socialization occurs in varying ways throughout an individual's life and includes parental influences, environmental influences, and academic influences. In addition to Weidman's socialization theory, Astin's (1984) theory of involvement is an appropriate model for understanding the involvement of students in their socialization process.

Astin's (1984) theory of involvement draws attention to the amount of energy and effort an individual devotes within an environment. This involvement includes participation in campus organizations and activities, in class discussions and projects, as well as within the academic environment as a whole. Astin's (1984) involvement theory is applicable for this study in that it highlights the involvement of transfer students in their socialization process in the community college and university environments. Situating the theory of involvement

within the socialization framework assists in understanding how students are involved academically and socially in their academic environments.

### Significance of the Study

As noted earlier, with over half of college degree-seeking students being women and only a small portion of them pursuing STEM academic paths, the nation is losing an important resource of highly talented individuals. This study is important because it focuses on female and male students who are at a very critical point in their academic journey. The Committee on Women in Science and Engineering of the National Research Council pointed out that U.S. students who pursue STEM academic paths make these decisions during their undergraduate academic journey (Matyas & Dix, 1992). Community colleges have been cited as helping transfer students who aspire to obtain bachelor degrees (Berger & Malaney, 2003). Moreover, community colleges play a vital role in providing pathways for transfer students who desire to transfer to 4-year institutions in pursuit of bachelor degrees (Laanan, 2006). Understanding the influences that are embedded in the identity of these students and improving the academic experiences of community college transfer students, more specifically women, during this crucial point in their academic career is of grave importance. It is essential that the environment in which women engage during their undergraduate academic path be examined in order to fully understand the environmental factors in which women are being fostered and exposed regarding STEM areas. Eileen Byrne (1993) pointed out that “if a plant doesn’t succeed in a garden, we don’t blame the plant first. We ask what it is about the soil, water, sun or fertilizer that is causing the problem” (p. 49). This very critical point of the academic journey was explored.



### Definitions of Terms

The following definitions were used for the purposes of this study:

*Academic adjustment*: the change to the academic standards, including rigor of classes, grades, etc.

*Community college*: any institution accredited to award the Associate of Arts, Associate of Science, Associate of General Studies, or the Associate of Applied Sciences as its highest degree. Included in this definition are comprehensive 2-year colleges as well as many public and private technical institutions.

*Doctoral/research universities—extensive*: universities that engaged in wide research activity.

*L-TSQ*: Laanan–Transfer Student Questionnaire—a survey instrument used to examine the community college and university experiences of community college transfer students (Laanan, 1998a, 2004).

*Pretransfer experiences*: the experiences that occur in the community college setting prior to transferring to the university environment.

*Posttransfer experiences*: the experiences that occur in the university setting after transferring from the community college.

*Social adjustment*: the interpersonal adjustments of individuals that may include making friends, meeting new people and being involved in social activities.

*Socialization*: “the process by which persons acquire the knowledge, skills, and dispositions that make them more or less effective members of their society,” which is “considered to be a lifelong process” (Brim, 1966, p. 3, as cited in Weidman, 1987, p. 11). The socialization experiences in this study include the individual’s background, community college environments, and the university environments.

*Transfer*: the movement of students from one higher education institution to another and the process by which academic credits are accepted or not accepted by a receiving institution.

*STEM*: science, technology, engineering and mathematics.

### Reflexivity Statement

The purpose of a reflexivity statement is to introduce to the audience the researchers' "historical and geographic situatedness, their personal investments in the research, various biases they bring to the work" (Denzin & Lincoln, 2000, p. 1027). The explicit identification of the inquirer's "biases, values, and personal background, such as gender, history, culture, and socioeconomic status" is essential to bring forth due to its foundation by which interpretations may be formed (Creswell, 2009, p. 177).

The area of women in STEM remains a passion for me. It is important to present myself as an expert in this area for a variety of reasons. I began my undergraduate study in a STEM field, Regulatory Science, which is interdisciplinary in nature. After a year of being in Regulatory Science, I switched majors and graduated with my Bachelor of Arts degree in Psychology. My three sisters are all STEM majors. The above information is essential in understanding my position in this study as a former STEM major. As I pondered over the word "socialization," my own experiences surfaced and became very evident. The literature draws attention to parental and cultural influences. My sisters and I grew up in the same household, were exposed to the same experiences, and were provided comparable opportunities. These facts increased my curiosity of the socialization beyond parental and cultural influences and interests, focusing more on the socialization within academic environments and the role of mentors, faculty, and classroom experiences on the academic

experience of individuals, more specifically females, in STEM areas. My interest enhanced as a result of my current experiences as a graduate research associate in the Office of Community College Research and Policy, I have been involved in a variety of research projects related to women in STEM areas. Through these research projects, I have explored the literature on women in STEM and have been involved in both quantitative and qualitative research that has provided a platform for me to engage in meaningful conversations regarding women in STEM areas. This knowledge base has also encouraged me to reflect on my own experiences as an undergraduate STEM major. Additionally, this knowledge base has allowed me the opportunity to have discussions with my three sisters who are currently pursuing undergraduate and graduate degrees in STEM areas. As one can see; my passion about this topic surfaces from a variety of perspectives.

#### Outline of Dissertation

This study attempts to build upon prior research in order to add to the knowledge of the socialization of community college transfer students in STEM areas. More specifically, this study seeks to add to the literature regarding the role of community colleges in increasing the representation of women pursuing baccalaureate degrees in STEM areas.

Chapter 2 summarizes the literature on women in STEM fields. The literature review will draw attention to and explore in detail the different layers of socialization for women in STEM, which includes gendered societal influences, academic preparation, as well as cultural and structural influences. Additionally, self-efficacy, as it relates to the subjective preparation of individual abilities and capabilities, is examined. Lastly, the role of community colleges in socializing women in STEM areas is highlighted. The socialization

process includes support systems and mentors (faculty and peers) as well as the overall academic and social integration as it relates to women in STEM.

Chapter 3 presents the quantitative and qualitative methodology and methods used in designing and conducting this study. Specifically, the research questions, hypotheses, research design, setting, population and sample, data collection, instrumentation, variables, data management, and method of data analysis are presented. This chapter also includes a comprehensive reporting of the demographics of the community college transfer students.

Chapter 4 includes a thorough overview of the findings of this study. This chapter provides statistical analyses of the community college and university experiences by gender are reported in this chapter. Additionally, the results of the sequential hierarchical regression analysis on the two dependent variables, social adjustment and academic adjustment, as well as the findings from the open-ended questions are provided. Lastly, this chapter provides the qualitative analysis and findings of the five female community college transfer students in STEM majors. Their voices are expressed through individual and group profiles and through a summary of emergent themes.

Chapter 5 summarizes the research and provides conclusions. Recommendations for policy, practice, and future research, as well as my final thoughts, are presented.

## CHAPTER 2. REVIEW OF THE LITERATURE

### Introduction

This chapter focuses on the review of literature pertaining to the socialization of community college transfer students in STEM fields. This study sought to examine the socialization factors as they relate to the female and male experiences within STEM areas. Societal influences and structures, which include academic institutions, are explored. The influence and structures of academic institutions take into account the classroom environment, academic preparation, and faculty interactions. Structural and cultural influences of socialization are also investigated. Additionally, this chapter draws attention to the influences of socialization experiences on mental processes, as well as the identity and self-efficacy development of female transfer students in STEM areas. Furthermore, attention is brought to the role of community colleges in increasing the participation of women in STEM areas. The literature review provides a framework for this study and establishes the importance of this study for comparison of results and findings from previous related research (Creswell, 2003).

This chapter is divided into four main sections deemed relevant to this study of exploring the socialization of women in STEM fields. A literature map highlighting essential literature regarding the socialization of transfer students in STEM majors is shown in Figure 1. The literature map draws attention to research on women in STEM, the levels of socialization and the role of community colleges and universities in socialization students in STEM majors.

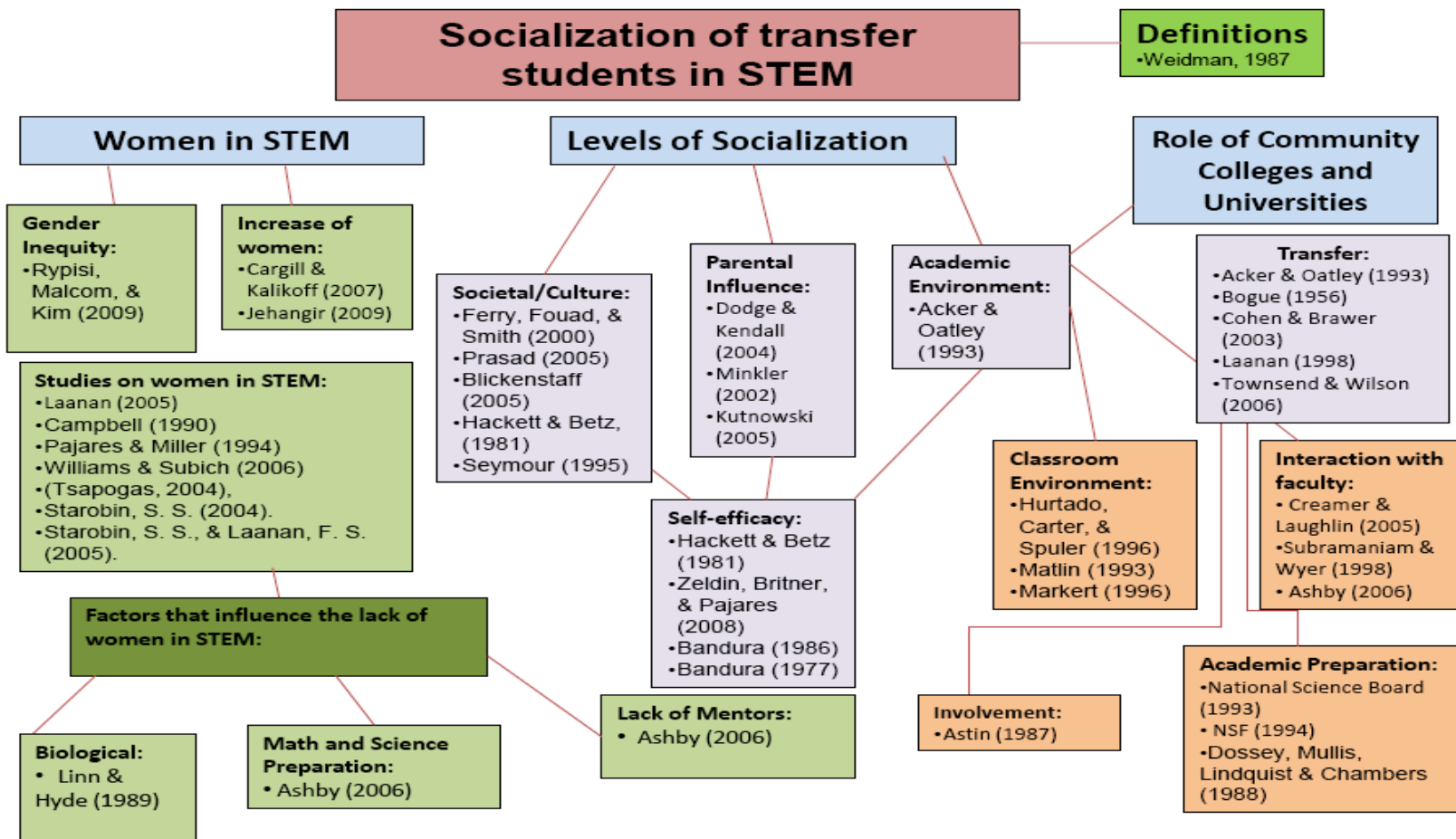


Figure 1. Literature map of the socialization of transfer students in STEM majors.

This chapter summarizes information regarding women in STEM. Next, the literature relevant to the socialization of women in STEM is reviewed. The review of the literature consists of the function of background information, academic experiences, and individuals' abilities. Different layers of socialization, consisting of background and gendered societal influences, academic preparation, as well as structural and cultural influences are explored. Subsequently, attention is drawn to self-efficacy as it relates to the subjective perceptions of women's individual abilities and capabilities. This section further highlights initiatives designed to increase the participation of women in STEM. Next, the pivotal role of community in socializing women in STEM areas is highlighted. This section draws attention to the history of community colleges and transfer adjustment. Lastly, the conceptual framework of undergraduate socialization is introduced and explored. Weidman's (1987) framework of undergraduate socialization is adapted to highlight the undergraduate socialization for community college transfer students.

### Women in STEM

Gender inequity regarding the disproportionate representation of females in higher education, more specifically in STEM disciplines, continues to be one of the most significant challenges in colleges and universities (Rypisi, Malcom, & Kim, 2009). A review of the literature shows a dearth of information on women in STEM fields ranging from one of disheartening information that highlights the concern regarding the lack of women in STEM as one that is "complex and highly underestimated with causes that are not well understood" (Acker & Oatley, 1993, p. 255) to one that highlights the slow increase of this population with some proposed causes and influential factors (Brainard & Carlin, 1998; Seymour, 1995). Although there has been a fortunate increase in the number of women pursuing

academic and career areas in STEM over the last few decades, the participation of this group in STEM areas continues to be disproportionately low (Dick & Rallis, 1991). The history of women in STEM fields paints the picture of one that fails to acknowledge women as capable beings in male-dominated areas who are able to “make worthy contributions to the professions” (Rypisi et al., p. 121).

The literature highlights, not only the shortage of women pursuing STEM fields, but also the concern regarding the retention rates of women who do pursue STEM majors and careers. Brainard and Carlin (1998) conducted a 6-year longitudinal study on the retention of undergraduate women in STEM areas at the University of Washington. The findings of the study indicate that although enrollment levels of women enrolling in engineering have increased, the retention rate of these women has decreased (Brainard & Carlin). Additionally, Brainard and Carlin found that, although women declare majors and enroll in STEM fields at increasing rates, fewer of these women actually graduate in their respective STEM areas of study. Moreover, about one third of U.S. engineering students switch majors before graduation (Committee on Prospering in the Global Economy of the 21st Century, 2005). The literature has suggested many factors that influence the underrepresentation of women in STEM. Earlier research identifying biological factors, which focused on sex differences among performance on math tests (Linn & Hyde, 1989), has ceased over time. Additionally, researchers have identified social class and ethnic differences as factors that complicate the issue of identifying factors that contribute to the underrepresentation of women in STEM (Chipman & Thomas, 1987). Brainard and Carlin added to the literature by asserting that “the lack of self-confidence, poor advising, and not being accepted in their department” (p. 374) were reasons for leaving the engineering field.



Enrollment in STEM disciplines among undergraduate women suggests that women are capable of performing and competing in male-dominated areas. However, the increase in enrollment does not reflect retention and ultimately graduation statistics among women in STEM (Brainard & Carlin, 1998). Clearly, there are other factors to consider when exploring the experiences of women in STEM areas. It is essential that not only the socialization of women in STEM fields be explored but also how women make meaning of their socialization experiences. Community colleges have been cited as the point of interest for many scientists and engineers (Tsapogas, 2004).

### Community Colleges

The history of American community colleges is one that entails not only a need to educate a community but also one that highlights a need to utilize this education of a community to benefit society. Community colleges, formerly known as junior colleges, came into existence in the early 1900s (Cohen & Brawer, 2003). During the late 1900s, the term *junior college* was used more often in reference to “lower-division branches of private colleges” (Cohen & Brawer, p. 4) and the term *community college* was most commonly used when referring to “comprehensive, publicly supported institutions” (Cohen & Brawer, p. 4). Inclusively, Cohen and Brawer defined community colleges as “any institution regionally accredited to award the associate in arts or the associate in science its highest degree” (p. 5)

Historically, several reasons have been cited for the growth of community colleges. In addition to the expectation of schools to respond to social problems, such as unemployment, gender and ethnicity integration and equity issues, schools were also expected to serve as intervention avenues for alcoholism, substance abuse, and teen pregnancy (Cohen & Brawer, 2003). Due to the flexibility of the community colleges with having “no traditions to defend,

no alumni to question their role, no autonomous professional staff to be moved aside, and no statements of philosophy that would militate against their taking on responsibility for everything” (Cohen & Brawer, p.5), community colleges became the perfect candidates for responding to societal needs. Universities also had a charge for community colleges. Educators of the 19<sup>th</sup> and 20<sup>th</sup> century viewed then-junior colleges as a way to relieve universities of the responsibility of teaching “lower-division preparatory work” (Cohen & Brawer, p. 7), so the focus of universities could be on research and professional development.

To this end, Dougherty (1998, as cited in D. D. Bragg, 2001) asserted that community colleges serve many roles in higher education and have been viewed as the single largest and most essential threshold into higher education. Three functions of community colleges were proposed after World War II: vocational, transfer (from community colleges), and continuing education (Bogue, 1956). To date, community colleges still fulfill the above missions with the inclusion of developmental education. However, since the 20<sup>th</sup> century, community colleges have focused primarily on the transfer function (Cohen & Brawer, 2003), where students transfer to a 4-year institution to complete the bachelor’s degree after attending a community college for the first 2 years of their education (Laanan, 1998a; Townsend & Wilson, 2006).

### *Community Colleges and Women in STEM*

The undergraduate educational phase of an individual’s academic career is an important area of analysis to consider when aspiring to increase the number of individuals in the pipeline for math and science areas of study. Undergraduate experiences will either increase STEM aspirations, specifically for women, or will decrease their aspirations. This

point is crucial for exploring not only gender imbalances but also gender equity in STEM areas.

The undergraduate stage is central to explore when attempting to understand and influence gender imbalances in science and engineering (Sonnert et al., 2007). Thoroughly exploring the background experiences as well as the academic experiences of female students sheds light on their lived experiences from childhood to the community college and ultimately to the university level. This understanding helps to comprehend how females are being socialized into STEM areas throughout their life span. The socialization of women into STEM areas has not been as prevalent in the lives of women as in that of their male counterparts. In any situation, individuals draw from familiar experiences to make sense of new experiences. The gap between the familiar and unfamiliar, more specifically the documented gap between the internalized social world of young American women and the academic worlds of STEM disciplines, causes individuals to draw on and pull from more familiar contexts to clearly understand how to make sense of new experiences and situations (Seymour, 1995). If the “familiar” consists of gendered specific roles, the underrepresentation of women in STEM areas continues. All of these factors, societal norms and expectations as well as academic environments, are layers in what Blickenstaff (2005) referred to as a “sex-based filter.” Community colleges play an essential role in uncovering and undoing these layers that have subliminally discouraged women from pursuing academic journeys in STEM areas.

The literature has recognized community colleges as great avenues to foster STEM aspirations among women. Women scientist and engineers are more likely than are men to have attended a community college at some point in their academic career (Tsapogas, 2004).

Institutional leaders have turned their attention to the role that community colleges play in the attainment of baccalaureate degrees, stating that students who transfer with an associate's degree from a 2-year college are more likely to complete a bachelor's degree (Glass & Harrington, 2002). Over the past few decades, community colleges have been key players in increasing the representation of female students in STEM areas (Starobin & Laanan, 2005), enrolling 58% of women (Phillippe & Patton, 2000). Several studies have examined factors that affect women in STEM. Additionally, Lee and Frank (1990) examined family background and demographics of potential transfer students instead of examining the academic environment of the community colleges, using quantitative methods as well. Academic environments and informal student interactions have proven to be beneficial for community college students (Thompson, 2001).

### *The Role of Community Colleges and Transfer*

As mentioned earlier, community colleges serve many roles. Among the many roles is the transfer function (Cohen & Brawer, 2003), where students transfer to a 4-year institution to complete the bachelor's degree after attending a community college for the first 2 years of their education (Laanan, 1998b; Townsend & Wilson, 2006). The transfer function of community colleges is essential to continuing to provide access to populations who would otherwise not be eligible for admission to a 4-year institution directly following high school (Laanan, 2001). The number of students aspiring to attend a community college prior to enrolling in a 4-year institution is increasing. To date; at least one out of every five community college students transfer to a 4-year institution (Eggleston & Laanan, 2001). The above statistics show community colleges as vital avenues to identify and recruit women to pursue bachelor degrees in STEM areas. Consequently, institutional leaders have begun to

focus on increasing the number of community college students who obtain a baccalaureate degree (Townsend & Wilson, 2006). The demographics of community colleges, including racial, ethnic, gendered, socioeconomic, and first-generation diversity, make community colleges essential avenues for increasing the diversity of the U.S. workforce in STEM careers. Moreover, community college participants are more likely to be women (D. D. Bragg, 2001).

### *Transfer Adjustment*

The transfer process from 2-year institutions to 4-year institutions can be very complex for transfer students and entails adjustments on many different levels, including “psychological, academic and environment” (Laanan, 2001, p. 5). Previous studies have shown that students transferring from 2-year institutions to 4-year institutions may experience “transfer shock” during the transfer process (Laanan, 2001). Transfer shock is defined by many researchers as a transitory dip in grades and GPA scores (Hills, 1965; Nolan & Hall, 1978). Rhine, Milligan, and Nelson (2000) expanded this definition to encompass “other academic and social factors that can result in student attrition and ultimate failure to achieve a bachelor’s degree” (p. 443). Additionally, many students experience an increase in GPA scores or “transfer ecstasy” after transferring to a 4-year institution (Laanan, 2001) where students are excited about transferring and their GPA scores increase.

The transfer behavior of students has been documented by many researchers. Although some researchers expressed concerns with the transfer educational success of students, asserting that students who attend community colleges are less academically prepared and are less likely to transfer (Brint & Karabel, 1989), contradictory literature is very explicit regarding the overwhelming success of students who begin their educational

journey at a community college. A comparative study conducted by Lee, Mackie-Lewis, and Marks (1993) on students who attended a community college post high school and those who enrolled directly into a 4-year institution found that the two groups were equivalent and did not differ in not only attaining a bachelor's degree but also in enrolling in graduate school. A more recent study conducted by Shaw and London (1995) reported high transfer rates and credited the ability of the colleges and universities to respond to the needs of the student body as a contribution to the high success.

### Socialization of Women in STEM

The socialization of women is extremely complex. Examining and exploring the factors that influence the underrepresentation of women in STEM is even more multifaceted and encompasses a variety of factors. The factors occur on many levels ranging from gendered societal and background factors to experiences with subject matter to the interpretation of the academic environment and eventually the individual's perceptions of her abilities and capabilities.

#### *The Function of Background, Academic Experiences, and Abilities*

The socialization of women in STEM is multilayered and is perpetuated throughout an individual's life span. The socialization of women in STEM consists of influential experiences on a variety of levels ranging from the societal level to the academic level and, ultimately, to the individual level of meaning making (Oakes, 1990). During the childhood and adolescent years, abilities and interest among individuals are developed (Ferry, Fouad, & Smith, 2000). Society hosts a wide range of gendered-specific behaviors that transpire throughout an individual's life span. These gendered identities are not only created but are accompanied with gendered scripts and expectations (Prasad, 2005, p. 166). These behaviors

form a culture of universally accepted roles for men and women. These gendered-accepted roles, while prevalent in society, have not escaped the academic environment. The culture and climates of STEM fields is another level of socialization that affects women's desires to pursue STEM fields. Factors that influence the underrepresentation of women in STEM fields occur both outside of the classroom as well as in academic settings (Acker & Oatley, 1993).

### *Levels of Socialization*

#### *Gendered Society/Background*

Society sets the gendered standards that form a specific culture. Childhood and adolescent years consist of the most intense periods of socialization (Seymour, 1995). Gender roles are set forth and established almost as soon as individuals are born. The literature has drawn attention to the early influence of playground activities that perpetuate gendered behaviors. Additionally, "adults teach children how to be 'an adult' through explicit lessons and through daily interactions with each other" (Blickenstaff, 2005, p. 381). These teachings may be filtered through the lens of what society has deemed to be gender appropriate behaviors. Males, for instance, are introduced early to experiences with mechanical and scientific-natured activities, which facilitate male appropriate activities (Hackett & Betz, 1981). Later in life males are introduced to experiences that foster life-long pressures to express themselves independent of nurturing. They are taught and encouraged to be strong individuals who are sole providers. An "intrinsic" sense of self-worth and the display of self-sufficiency and stoicism are among the many masculine characteristics men are pressured to exhibit (Seymour). Men are viewed as essential beings that are able to withstand outside of the association of other individuals or components. All of the above societal influences

socialize men into a culture that embraces what is familiar and what is considered to be appropriate “male” behaviors.

Conversely, the socialization of women encourages a more “extrinsic” identity (Seymour, 1995). Acceptance of others and the attachment of feelings are common. Women tend to be more relational and value relationships more than men do. A study conducted by Campbell (1990) revealed that men find success in their own abilities and attribute unsuccessful happenings to external forces, whereas women attribute their success to teachers, faculty, and peers and internalize their unsuccessfulness. These “gender specific” roles, such as “housewife, the career women and Supermom” (Prasad, 2005, p. 166) are taught early in life and are more than likely referred to when making decisions. Additionally, expectations of motherhood and the balance of motherhood can influence women’s aspirations to pursue STEM areas of study. Physicists reported that “one of the major obstacles in [women’s] path on the way [in STEM areas] was the expectation that they would also be the primary caregiver for their children” (Ivie, Czujko, & Stowe, 2002, p. 23).

STEM fields are considered specific to White male scientists because Blacks and women were not considered to have the mental capability to participate in such an area (Blickenstaff, 2005, p. 382). These gendered-specific fields can appear to be unfamiliar to women. This unfamiliarity can be even more overwhelming if not counteracted with more encouraging environments and interactions that abstain from perpetuating societal stereotypes.

### *Cultural Stereotyping*

Cultural stereotyping of science (Frieze & Hanusa, 1984) and math (Armstrong, 1981) as being masculine is very strong. Many studies have indicated that math is viewed as



masculine and perceived to be a male domain (Armstrong; Whyte, 1986). Males are exposed to male-dominated activities early in life. Fetler (1985) found that males were more likely to not only have computers and computer games, which reflect masculine patterns of aggression and competitive themes at home, but they also are more likely to be encouraged to attend computer camps (Acker & Oatley, 1993). Additionally, a study conducted by Seymour and Hewitt (1997) found that many of the women in their study who were currently or previously enrolled in engineering and math majors had difficulty “giving themselves permission” to pursue math and science majors. Interestingly, these women were unable to explain the source of their discouragement (p. 241).

The above studies demonstrate the shared cultural beliefs that males are more competent than are their female counterparts in mathematics. Academic structures and climates also affect women in STEM areas. The sex-role stereotyping of activities and occupations influences the low self-efficacy expectations of women in masculine-stereotyped occupations (Whiston, 1993). Gender influences appear in academic environments as well. These environments, however, require that women are able to academically compete with their male counterparts in math and science. These subject areas can be the determining factor on whether women continue in STEM areas (Betz & Hackett, 1983).

#### *Academic Preparation*

According to Oakes (1990), policymakers are paying more attention to the quality of mathematics and science education” (p. 154). Oakes shed light on three essential factors in the attainment of scientific fields: “1) opportunities to learn science and mathematics; 2) achievement in these subjects; and 3) the decision to pursue them” (p. 16). For the above noted reasons, it is impossible to examine the underrepresentation of women in STEM

without exploring math and science preparation and performance. According to Betz and Hackett (1983), mathematics is the critical filter that influences the choice of women to pursue STEM fields.

Before Title IX, schools were segregated and girls learned the ABCs of cooking and other home economics-focused classes. Males, on the other hand, were encouraged to participate in structure building and to take math and science classes. After Title IX, female students were offered the same classes as their male counterparts.

*Title IX.* Section 901 of Title IX of the Education Amendments of 1972 provides that: No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. (Title IX of the Education Amendments of 1972, 1972, §1681(a))

STEM fields include a wide range of disciplines including agriculture, physics, psychology, medical technology, and automotive engineering, which require completion of higher level and advanced courses in mathematics or science. If these classes are not successfully taken, one can become discouraged at the mere thought of pursuing a STEM degree. Oakes (1990) suggested that the preparation of women in science had increased over the previous two decades. With that said, women are still underrepresented in advanced math and sciences courses. Research has shown that by the time students reach high school males are more likely than are females to be enrolled in advanced level elective math and science classes (National Science Board, 1991; NSF, 1994). Additionally, Dossey, Mullis, Lindquist, and Chambers (1988) found that men were more likely to enroll in advanced high school and college math courses than were their female counterparts. Oakes found similar patterns of

women and minority students taking fewer advanced classes than their male counterparts. Gender differences in math and math-related areas are viewed to be the result of negative socialized attitudes and reactions to these male-dominated areas (Hackett & Betz, 1981). Academic course selection plays a vital role in how an individual, more specifically women in STEM fields, are socialized into an area of study. For this reason, it is essential that early intervention takes place to decrease the gap in the number of women pursuing STEM degrees.

Although previous studies that focused on gendered differences in academic performance revealed significant differences in female and male performance in quantitative areas, favoring males (Maccoby & Jacklin, 1974), more recent studies have shown much smaller differences in female and male performance in these areas (Hyde, Fennema, & Lamon, 1990). The discrepancies in gender differences in academic preparation urge a closer investigation into additional factors that discourage women from pursuing STEM areas.

#### *Structural and Cultural Academic Factors*

Campus climates have many dimensions ranging from interactions across varying demographic characteristics to intergroup relations (Hurtado, Carter, & Spuler, 1996). The environment most relevant to this study is what Matlin (1993) referred to as the “null academic environment.” A null academic environment “exists when faculty members do little to support or encourage their students” (Markert, 1996, p. 23). Other researchers have labeled this type of environment the “chilly classroom environment” (Matlin). From this perspective the culture and instructional practices in science education—sexist humor, male-dominated discussions, lack of female role models and same-sex peer support, disparaging comments about women’s abilities, and the perception that female students have less

potential—erode women’s self-esteem and contribute to a decline in their academic and career aspirations (Matlin).

Chilly classroom climates consist of differential treatment of men and women in classrooms. Women may experience unfair treatment with little attention and support. This treatment can make women feel devalued and unsupported. According to Rypisi et al. (2009), “women may find it very difficult, or simply undesirable, to comply with the cultural practices of the STEM disciplines” (p. 124). A 3-year ethnographic study conducted by Seymour (1995) found the following as factors that negatively influenced women in STEM:

- Female students felt unwelcomed and uninvited by faculty members in classroom activities;
- Classroom environments were overwhelming and impersonal;
- Students did not feel comfortable approaching or interacting with the teachers in the classroom;
- Students felt a lack of feedback regarding the student’s academic performance; and
- Competition for grades was excessive. (p. 470)

Women in STEM areas, unfortunately, discover overwhelming male-dominated environments and classrooms and are ultimately expected to conform to masculine ways of instruction (Wolffensperger, 1993). Anne Wilson Schaef (1992) asserted that women pursuing STEM areas are living in foreign territory dominated by a “white male system” (p. 8). In this system, women must conform to prescribed roles in order to survive in a culture that does not recognize their unique identities, talents, and abilities (Schaef). A study conducted by Hall and Sandler (1982) found that in the classroom, male students were acknowledged more for their efforts and contributions to the class. They were more likely to

“have taken and held the floor for presenting their views and to have received a greater amount and more effusive public praise for their achievements than were the women” (p. 3). Campus climates can have great effects on women and can discourage their participation. Additionally, negative out-of-the-classroom experiences also affect women pursuing STEM fields. These previously established cultures (Rypisi et al, 2009) create an environment unwelcoming to women (Schaefer). Women in STEM areas are more likely to be successful in a supportive social climate where they are viewed as a part of the environment (Beer & Darkenwald, 1989). Additionally, their perception of the value of the classroom environment is established in part by how they feel they “belong” and are treated fairly by their professors (Seymour & Hewitt, 1997). Bandura (1997) highlighted role models as essential influences in the socialization of women in STEM areas. Additional research has supported this view by asserting that gender differences regarding science and mathematics self-confidence are related to academic environmental factors that consist of formal and informal student–faculty interaction (Seymour, 1995; Stage & Kloosterman, 1995).

#### *Mentee–Mentor Relationships and Support Systems*

Research also has drawn attention to the importance of relationships and roles models for women in STEM fields. Activity and program leaders who support gender equity acknowledge the instrumental role of parents and educators in encouraging young women’s interest in careers in STEM (Creamer & Laughlin, 2005). Successful women in STEM understand the importance of mentee–mentor relationships. This relationship sets the foundation and has the greatest effect on whether women choose to leave or continue in the science field (Subramaniam & Wyer, 1998). In a report by the Government Accountability Office, one professor asserted that mentors helped students by advising them on the best

track to follow for obtaining their degrees and achieving professional goals (Ashby, 2006). Additionally, in September 2000, a congressional commission reported that women were adversely affected throughout the STEM education and career pipeline by a lack of role models and mentors (Ashby).

Teachers, advisors, and peers also play a vital role in fostering the aspirations of women pursuing a degree in a STEM area. Women are more relational and are more likely to consult and take advice from others when making career-related decisions (Seymour & Hewitt, 1997). For this reason, both positive and negative influences affect a woman's desire to pursue a male-dominated area of study. Starobin (2004) asserted that encouragement from both the home and school environment helps develop the self-concept of women in STEM areas. Some authors have suggested that women who decide to pursue nontraditional majors receive more support and encouragement and have more positive interactions with faculty, advisors, parents, and peers, more specifically from fathers and male peers (Fitzpatrick & Silverman, 1989; Sax, 1994). However, Seymour and Hewitt highlighted the converse encounters, stating negative influences and experiences with teachers, advisors, and peers are factors that contribute to why women depart from STEM majors. Rayman and Brett (1995) asserted that support from both parents is an even stronger predictor of STEM choice than support from a single parent. However, parents exhibiting sex-stereotypical views may discourage women from pursuing careers in male-dominated areas of study (Shashaani, 1994). Teachers, counselors, and other individuals in education settings who work with women in STEM areas are in very essential positions regarding the influence they have on women who aspire to pursue STEM areas. The quality of the feedback and advice given to these particular women could affect the self-efficacy and the perception these women have of

their abilities to pursue STEM related majors and careers. Bandura (1997) credited the success of women in STEM areas, despite academic and social obstacles, to their confidence in their abilities and capabilities.

### *Self-Efficacy*

The overall socialization of women has had many impacts on the way women view their performances in different areas and has also affected the outcome of their decisions with respect to pursuing nontraditional majors and careers. These socialization experiences have resulted in many women failing to realize their abilities and talents in career and college major pursuits (Hackett & Betz, 1981). Many researchers, more specifically those researchers who embrace social cognitive perspectives, have attributed the underrepresentation of women in STEM areas to the women's beliefs about their capabilities (Zeldin, Britner, & Pajares, 2008). Self-efficacy was defined by Bandura (1986) as a person's judgment of his/her own capabilities of performing a specific task in the near future and was initially introduced to the career literature to explain the underrepresentation of women in nontraditional majors and courses such as STEM areas (Zeldin et al.). Hackett and Betz extended Bandura's (1977) theory to incorporate career behavior. These researchers highlighted the role of self-efficacy in understanding gender differences in educational and career choices. Individuals' perceptions of their abilities and capabilities are extremely powerful and affect the choices they make; the effort they exhibit; and how they interpret, analyze, and overcome obstacles they face (Zeldin et al.).

Bandura (1997) postulated that individuals form their self-efficacy by interpreting information from four sources: (a) authentic mastery experiences, (b) vicarious experiences, (c) social persuasions, and (d) physiological indexes. The most influential information,

however, comes from the mastery experiences, which are the interpretations of past experiences (Zeldin et al.). Modeling, which is a vicarious experience, has influence “when the models observed are perceived to be similar to the observer and in situations in which the observer has little personal experience” (Zeldin et al., p. 1037). These models serve as information by which most information is learned. Bandura (1997) asserted that “fortunately, most human behavior is learned observationally through modeling; from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action” (p. 22).

Hackett and Betz (1981) asserted that women are less likely than are men to be exposed to models pertinent to career-related efficacy. A study conducted by Pajares and Miller (1994) revealed that college women’s perceptions of their math-related abilities were significantly lower than were those of men. A similar study conducted by Williams and Subich (2006) found that women who pursued more traditionally female areas of study had higher learning experiences. The strong connection that exists between gender and an activity increases the likelihood of encountering gender differences in self-efficacy (Hackett, 1995). Women are faced with socialization on all levels that influences how they perceive their ability and capabilities in different areas, more specifically STEM areas. The different influences range from the role of background experiences in gender role socialization (Betz & Hackett, 1983) to the discrepancies in academic preparation (Hyde et al., 1990; Maccoby & Jacklin, 1974). The different levels and means of socialization lead one to believe that self-efficacy is influenced by the level and means of socialization, which is affected by the environment in which individuals, in this case women, are exposed.



Historically, women have not been holistically well-received into the environment and culture of STEM areas. The factors that encourage success in such fields have all but embraced the talents and abilities of women aspiring to embark on such an advanced journey. Among several institutions that have been cited as increasing the underrepresentation of women in STEM, community colleges have been placed at the forefront of creating an atmosphere conducive of gender equity in STEM areas. It is essential to examine the role of community colleges and community college environments in influencing female obtainment of baccalaureate degrees in STEM areas. Although women enroll in community colleges more frequently than do men (Tsapogas, 2004), relationships that exist among faculty and peers are “more important for women early in college careers” and this stage is acknowledged to be the “latest point” for students to enter into a science or engineering field (Xie & Shauman, 1997). Additionally the undergraduate years are central when attempting to understand and influence gender imbalances in science and engineering (Sonnert et al., 2007).

It is important to note that many researchers interested in academic socialization processes have argued that women experience what they referred to as an acculturation process more so than a socialization process when aspiring to make their presence known in academia (Jenson, 1982; Reynolds, 1992). The term “acculturation” is used to highlight the altering of the “female identity” that is necessary in an overwhelmingly male environment such as the professoriate (Jensen). The present study, however, examines the academic preparation factors and the academic environmental factors that impact adjustment among women in STEM majors.

Several programs exist that support the recruitment of women and underrepresented populations in STEM majors. Among these programs is the Program for Women in Science and Engineering (PWSE) that currently exists at ISU.

PWSE was founded in 1986 by a group of ISU faculty and staff concerned about the underrepresentation and underutilization of women in science and engineering. In its over two decade history, PWSE has evolved into a nationally recognized program that is working to increase the participation of women in science, technology, engineering, and math (STEM) fields through a wide range of programs and partnerships. PWSE has K–14 outreach programs that reach thousands of girls and women each year. It also provides support to undergraduate women at ISU enrolled in STEM programs across four academic colleges. (PWSE, n.d.)

There are several essential components to PWSE that assist in the recruitment and support of women and underrepresented populations in STEM majors. Through the Student Role Model component of PWSE, ISU undergraduate students work with K–12 students who are interested in science and math. The K–12 students are challengingly engaged through different activities and opportunities focused on science and math areas. In addition to the Student Role Model Program are Career Conferences, which focus on grades 6–12. Moreover, PWSE has a strong interest in expanding its efforts to community colleges and transfer students.

In 2007, ISU received funding from the National Science Foundation (NSF). Partnerships between ISU Engineering and Des Moines Area Community College (DMACC) have been created through the NSF-funded Student Enrollment and Engagement Through Connections (SEEC) project, which is also administered through PWSE. The purpose of the

SEEC grant was to increase the diversity of community college transfer students in the engineering program at ISU. It is essential to note that during the 2008–2009 school year 32.6% of the undergraduates enrolled in STEM fields at ISU were women (*A look back, 2009*).

## Conceptual Framework of Community College Transfer Student's Involvement and Socialization

### *Theory of Involvement*

Astin's (1984) theoretical framework of involvement was used in this study. Astin's theory has its beginnings in a longitudinal study on dropouts. This study concluded with the suggestion that the level of involvement contributed to students' persistence. Astin defined involvement as:

the amount of physical and psychological energy that the student devotes to the academic experience. Thus, a highly involved student is one who, for example, devotes considerable energy to studying, spends much time on campus, participates actively in student organizations, and interacts frequently with faculty members and other students. Conversely, a typical uninvolved student neglects studies, spends little time on campus, abstains from extracurricular activities, and has infrequent contact with faculty members or other students. (pp. 297-298)

Astin further highlighted five basic postulates of involvement:

1. Involvement refers to the investment of physical and psychological energy in various objects. The objects may be highly generalized (the student experience) or highly specific (preparing for a chemistry examination).

2. Regardless of this object, involvement occurs along a continuum; that is, different students manifest different degrees of involvement in a given object, and the same student manifests different degrees of involvement in different objects at different times.
3. Involvement has both quantitative (how many hours the student spends studying) and qualitative (whether the student reviews and comprehends reading assignments or simply stares at the textbook and daydreams) features.
4. The amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program.
5. The effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement.

### *Socialization Theory*

The theory of Weidman's (1987) undergraduate socialization was also used in this study to examine the socialization of women in STEM fields. Socialization has been defined as "the process by which persons acquire the knowledge, skills, and dispositions that make them more or less effective members of their society," and is "considered to be a lifelong process" (Brim, 1996, p. 3, as cited in Weidman, 1987, p. 11). Weidman (1987) drew attention to the subcultures that exist within the larger society and the attitudes and behaviors that are specific to each subculture. For this reason, individuals are a part of many subcultures and are therefore socialized on many different levels. Weidman (1987) extended the theory of socialization, however, to the context of undergraduate socialization by stating

later that socialization is “suggested as a unifying schema for understanding the process of college impacts on students” (Weidman 1989, p. 5).

There are three essential elements to consider when discussing socialization: (a) socialization is a continuous process, (b) socialization is a learning process, and (c) socialization is a social process. For socialization to occur, individuals must learn the appropriate roles and behaviors by interacting and being involved with their environment. During this learning process, feedback regarding appropriate roles and behaviors is essential. Additionally, individuals must socialize with other individuals who are a part of the group or who have already obtained membership into the desired group (A. K. Bragg, 1976). Therefore, socialization involves five steps that are taken from the perception of the individual who is being socialized:

1. Observation, which is the identification of a role model(s);
2. Imitation, which is the “trying on” of the role model’s behavior;
3. Feedback, which consist of the evaluation of the “trying on” of behavior;
4. Modification, which is the alteration or refinement of behavior as a result of evaluation; and
5. Internalization, which is the incorporation of the role model’s values and behavior patterns into the individual’s self-image. (p. 6)

The suggested conceptual framework (Figure 2) contains “socializing influences experienced by undergraduates from a variety of sources, both within and external to the postsecondary educational institution” (Weidman, 1987, p. 2) with an emphasis on the “social structure of socialization” (p. 5). The conceptual model includes:

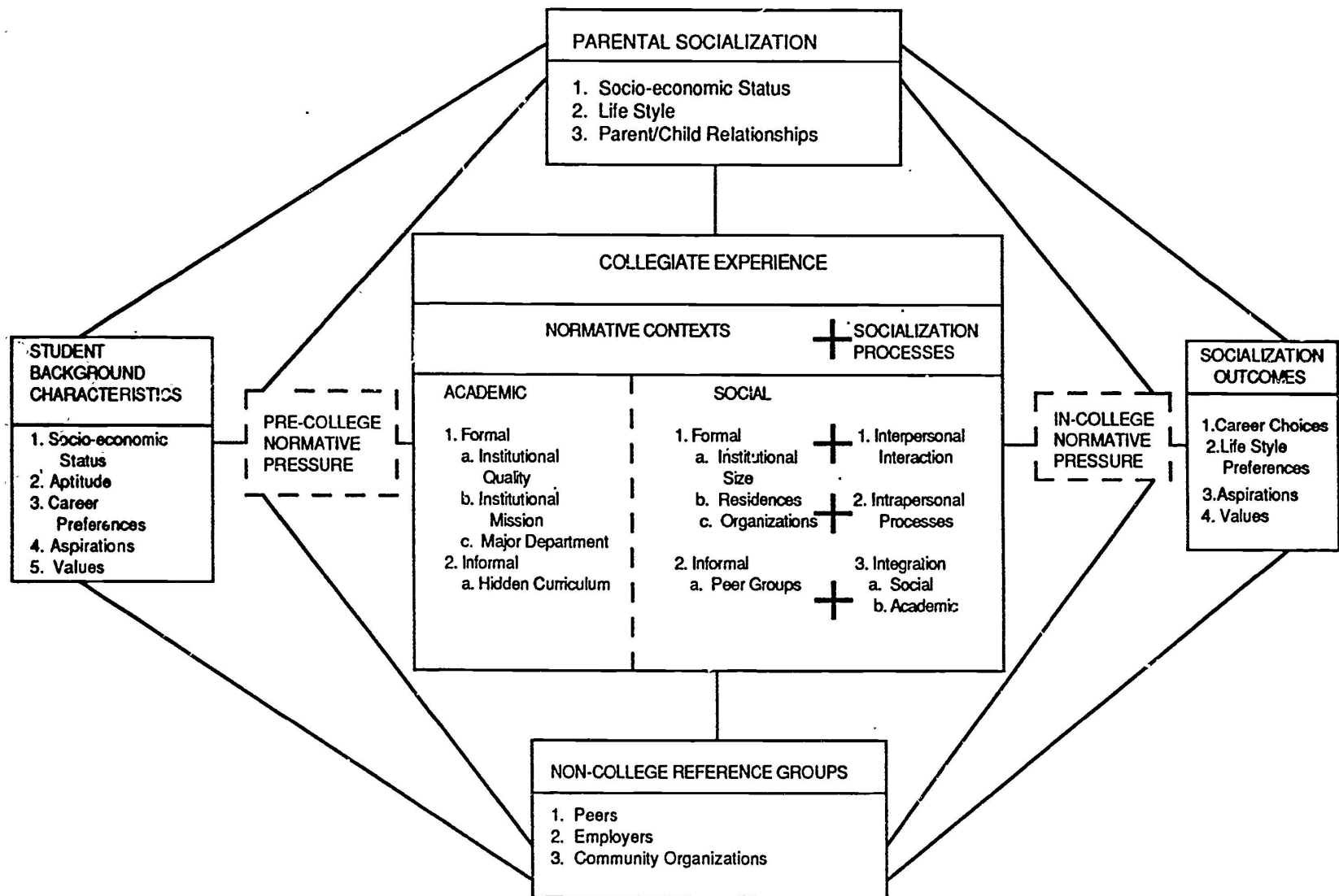


Figure 2. Weidman's conceptual framework of undergraduate socialization (Source: Weidman, 1987, p. 56).

consideration of the joint socializing impacts of: 1) student background; 2) the normative influences exerted by the academic and social structure of the college through the mechanisms of both inter- and intra-personal processes; and 3) the mediating impacts of both parental socialization and non-college reference groups during college despite influences brought to bear upon students by participation in the more immediate campus social structure. (Weidman, 1987, p. 2)

Student background takes into account socioeconomic status, aptitude, career preference aspirations, and values. Precollege normative pressures highlight peers, employers, and community organizations that are not associated with the college environment. Additionally, collegiate experiences take into account the academic and social contexts. Weidman (1987) did point out that the framework is not exhaustive. Additional variables could be included based on the interests of the researcher. Weidman's framework is essential to this study because it includes gender and an influential factor and recognizes that gender plays a critical role in socialization experiences.

The framework is linked bidirectionally, assuming that reciprocity of influences occurs over the college years and varying dimensions of the model can assume lesser or greater importance depending on the point students are in their lives. In addition, parental socialization, noncollege reference groups, and socialization outcomes are highlighted. The model also emphasizes pre- and in-college normative pressures. The precollege normative pressures include individuals who are not a part of the collegiate environment. These pressures include but are not limited to significant others' and students' background characteristics. Situating the theory of involvement within the socialization framework assists in understanding how community college transfer students are involved academically and

socially in their academic environments and the impact of this involvement on their academic and social adjustment at the 4-year institution.

Understanding the level of transfer students' involvement in their socialization experiences will assist in understanding how students adjustment, both academically and socially at the 4-year institution. The collegiate experiences differentiate normative contexts into academic and social pressures. Student background characteristics highlight the socioeconomic status of the family as well as values, aspirations, and academic aptitude attention to the influences of the parents through lifestyles and relationships between the child and parent. Weidman (1987) assumed that parental influences are "present throughout the college years, even for those students who are independent householders" (p. 15).

It is important to mention that, for the purposes of this study, the collegiate experiences will include academic and social contexts. For the purposes of this study, Weidman's (1987) framework was adapted and adjusted and encompasses components shown in Figure 3. The hypothetical conceptual framework of undergraduate socialization of community college transfer students (Figure 3) provides an understanding of the overall socialization in STEM areas and serves as the guiding framework in conceptualizing the socialization process of women in STEM. This framework also expands on Weidman's (1987) framework and highlights race and ethnicity, which is not controlled for in Weidman's framework. This study highlights three levels of socialization including: (a) background and family factors, (b) community college experiences, and (c) university experiences. The background and family influences take into account parental income and education levels as well as gender and highest degree intended to obtain. The community college and university experiences highlight factors associated with faculty interaction,



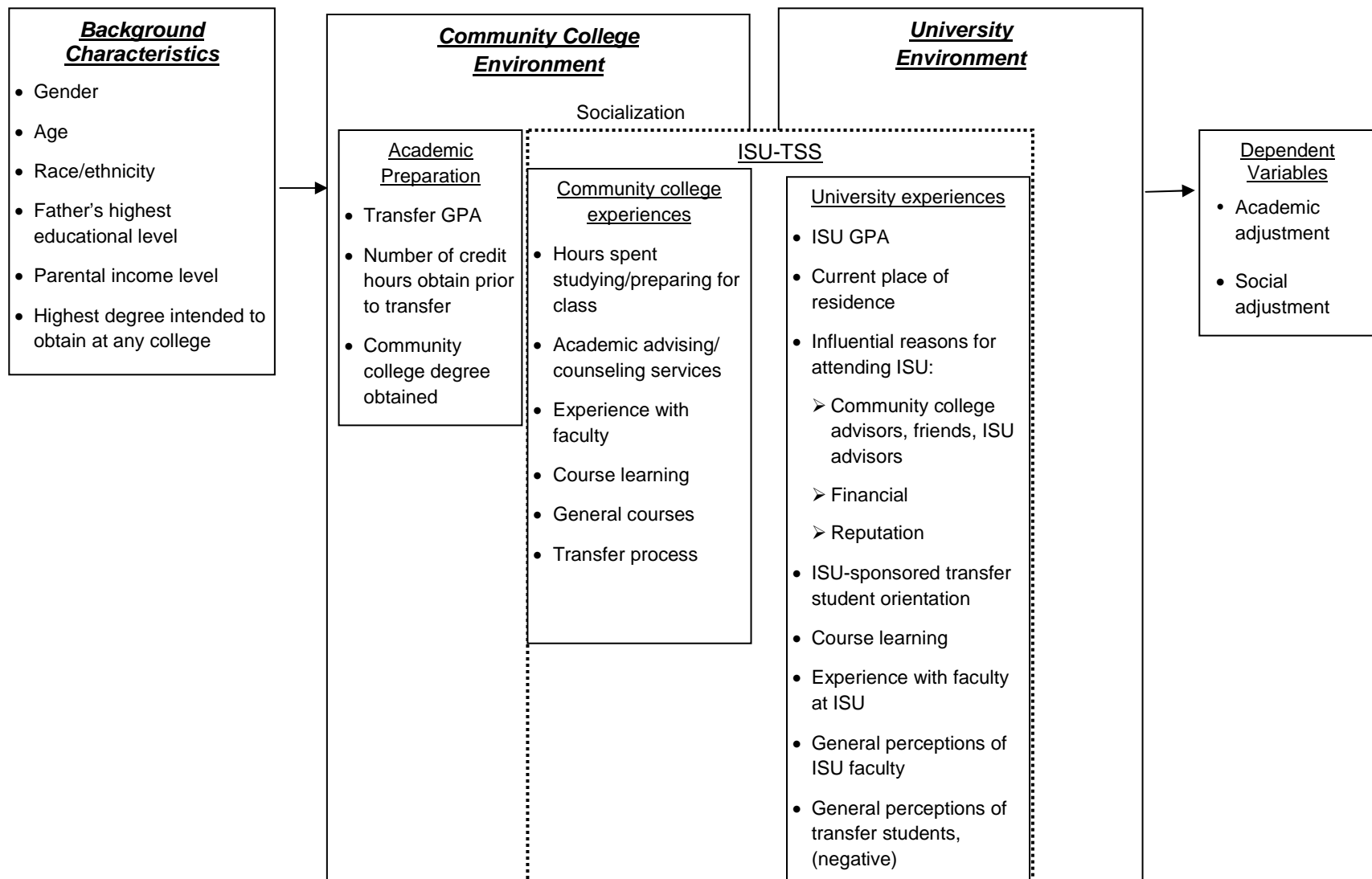


Figure 3. Hypothetical conceptual framework of undergraduate socialization for community college transfer students.

classroom environment, course learning, and reasons for attending ISU. Classroom climates, mentee–mentor relationships, and essential resources are explored.

### *Application of Socialization Theory*

Research on the socialization process in higher education has been conducted mostly at the professional and graduate education levels (A. K. Bragg, 1976). A case study conducted by Mendoza (2007) focused on the socialization of doctoral students. The study sought to “elicit the differences in organizational culture knowledge between students in early stages of socialization and students beyond candidacy as a strategy to understand socialization processes” (Mendoza, p. 78.). Austin (2002) conducted a qualitative study to explore the socialization of doctoral students to the role of faculty members. Weidman, Twale, & Stein (2001) conducted a quantitative study to address socialization of doctoral students to the academic norms of research and scholarship.

The socialization process has also been conducted on faculty as well. Tierney and Rhodes (1993) conducted a study that focused on the socialization of faculty as a cultural practice. Within this study, they explored two general stages of faculty socialization, which included undergraduate socialization and graduate socialization and identified several concerns regarding women in academia. Among the identified socialization concerns were “inadequate anticipatory socialization, weak mentoring relationships, and fewer networking opportunities” (Tierney & Rhodes, p. 76). Johnson (2001) conducted a qualitative study to explore “influences and barriers in the socialization experience of African American tenure-track and tenured faculty in the social sciences and humanities at two urban Black colleges” (p. 630). After exhaustive research, Seymour’s (1995) study was the only one that focused

primarily on the socialization of undergraduate students. Additional studies are needed on this population.

### Summary

Students are socialized in varying ways. It is through socialization that students learn and understand the norms of a particular area. Socialization includes the parental, societal, and cultural influences that exist prior to entering the collegiate environment. This socialization is also presented in the academic environment. The socialization of undergraduate students is essential in understanding the precollege, in-college, and different noncollege reference groups and pressures that impact the socialization outcomes of undergraduate students, more specifically community college transfer students. Weidman's (1987) conceptual model of undergraduate socialization is essential because it takes into account gender as an input. Current literature is very explicit regarding the different levels of socialization, which include background influences, parental influences, collegiate influences, and normative pressures that occur prior to college and while in college.

## CHAPTER 3: METHODOLOGY

### Overview

The purpose of this study was to examine the socialization factors of community college transfer students pursuing STEM majors at ISU. More specifically, this study seeks to examine the background characteristics and the community college and university experiences that predict academic and social adjustment for female and male community college transfer students in STEM majors.

Survey items measured the two dependent variables: academic and social adjustment. A particular interest within this study was the socialization of female community college transfer students in STEM majors. Qualitative interviews were conducted to understand the overall experiences of female students in STEM areas of study. The knowledge gained from this study will assist institutional policymakers and educational institutions in providing and improving educational opportunities and environmental socialization factors for community college transfer students in STEM majors.

A description of the methodological approach employed for this study is presented in this chapter. This chapter outlines the research questions, hypotheses, research design, setting, population and sample, data collection, instrumentation, variables, data management, and method of data analysis for both the quantitative and qualitative sections. This chapter concludes with information regarding ethical issues, limitations, and delimitations of the study.

### Research Questions

The following quantitative (research questions 1–4) and qualitative (research question 5) questions guided this study:

1. What are the background characteristics of Iowa community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?
2. What are the community college and university experiences of ISU community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?
3. Are there statistically significant differences in the community college and university experiences by gender?
4. What background characteristics and community college and ISU experiences predict academic and social adjustment for community college transfer students in STEM majors at ISU?
5. How do female community college transfer students describe their overall socialization experiences in STEM majors?

Exploring the above questions provides essential information to 2-year and 4-year faculty members, administrators, and state policymakers regarding the factors that hinder or enhance the academic and social adjustment for community college transfer students in STEM majors. The findings of this study will add to the body of knowledge regarding academic environments for community college transfer students pursuing STEM areas of study. A specific area of inquiry in this study is the experiences of female community college transfer students pursuing bachelor degrees in STEM majors and how they describe their experiences.

### Hypotheses

A hypothesis is offered for each outcome variable addressed. Each hypothesis is written in the literary null hypothesis form, which is concept oriented and nondirectional

(Creswell, 1994). The first two research questions posed are descriptive in nature and, therefore, did not require a hypothesis. Research question 3 is inferential, and research question 4 is inferential and predictive in nature.

Research question 3: Are there statistically significant differences in the community college and university experiences by gender?

Hypothesis 1: There is no relationship between a student's community college and university experiences and gender.

Research question 4: What background characteristics and community college and ISU experiences predict academic and social adjustment for community college transfer students in STEM majors at ISU?

Hypothesis 2: There is no relationship between background characteristics and community college and university experiences on students' academic and social adjustment process at the university.

The objective of this study was to determine if the level of academic and social adjustment for community college transfer students is influenced by the level of independent variables including background characteristics and community college and university experiences.

### Research Design

Figure 3 (in chapter 2) illustrates the hypothetical conceptual framework of community college transfer student socialization that was used as the overarching framework in this study. This research employed a quantitative research design with a qualitative component. A survey research design, more specifically an *ex post facto* research design, was used for this study. An *ex post facto* study “moves from outcomes to predictors, not from predictors to outcomes” (Light, Singer, & Willett, 1990, p. 135). In other words, the design

of such a study causes the researcher to “reason backwards” (Light et al., p. 135) by focusing on the outcome group, which in this case are students who are in STEM majors. The groups are intact and were not manipulated. The socialization of this intact group of students in STEM majors at ISU was examined and explored through quantitative and qualitative research.

A survey research design was used in this study. The use of a survey design “provides a quantitative or numeric description of trends, attitudes, or opinions of a population” (Creswell, 2009, p. 145). Survey research is a research method involving the use of questionnaires and/or statistical surveys to gather data about people, their thoughts, and their behaviors. The use of survey research allows the researcher to make generalizations about the population based on the results from the findings. The ISU Transfer Student Survey (ISU-TSS; see Appendix A), an online survey instrument adapted from the Laanan–Transfer Student Questionnaire (L–TSQ; Laanan, 1998a), was used for this study. The instrument includes quantitative and open-ended responses. The survey collected background characteristics, community college information, and university information. Open-ended survey questions focused on ways the community college could assist with the transition process as well as advice to prospective students. Additionally, I also used individual semistructured interviews with female participants to address the research questions. The qualitative component was used to further explore the socialization experiences of female community college transfer students pursuing STEM majors at ISU. Academic preparation information was obtained from the registrar’s office at ISU to examine community college transfer GPA, the number of credits earned prior to transfer, and community college degree earned.

### Setting

The site of this study was Iowa State University (ISU), a Research I institution in the Midwest. ISU is an international, prestigious university that enrolls nearly 28,000 students. *U.S. News & World Report* has ranked ISU, with over 100 majors and 750 student organizations, among the top 50 public universities (ISU 2010b). The student body includes student representation from all 50 states and more than 110 countries. ISU is a land-grant institution that is internationally recognized for research programs. According to the Carnegie Classification, ISU is classified as Very High Research. Additionally, ISU's undergraduate engineering program is one of the 10 largest in the United States. *U.S. News & World Report* ranks the following graduate programs at ISU as among the top 25 of each program at public universities: statistics (7<sup>th</sup>); inorganic chemistry (10<sup>th</sup>); analytical chemistry (12<sup>th</sup>); aerospace engineering (15<sup>th</sup>); industrial and manufacturing systems engineering (15<sup>th</sup>); counseling/ personnel services (17<sup>th</sup>); materials science and engineering (20<sup>th</sup>); chemical and biological engineering (22<sup>nd</sup>); chemistry (22<sup>nd</sup>); mechanical engineering (22<sup>nd</sup>); civil, construction and environmental engineering (23<sup>rd</sup>); electrical and computer engineering (24<sup>th</sup>); and the College of Engineering's overall graduate program (24<sup>th</sup>; ISU, 2010b).

It is also important to mention that more Iowa high school graduates and transfer students enroll at ISU than at any other higher education institution in Iowa. In 2008, ISU enrolled 1,537 transfer students with 945 of the transfer students being from Iowa area community colleges.

### Population and Sample

According to the Iowa Board of Regents (2002), "approximately 57% of new undergraduate transfer students to Regent institutions [including ISU, the University of Iowa



and the University of Northern Iowa] come from Iowa community colleges. Between Fall 1988 and Fall 2002, the number of community college students who transferred to Iowa Regent universities increased by almost 52%” (p. 1).

ISU enrolls transfer students at increasing rates. Table 1 shows the transfer admission trends from 1999–2008. It is noteworthy to mention that more than 50% of all transfer students during 1999 and 2008 transferred from Iowa Area Community Colleges, followed closely by those students who transferred from non-Iowa area schools.

Table 1.

*Fall Semester New Transfer Students by Type of Transfer College at ISU*

Transfer college type	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Iowa Area Community Colleges	902	922	930	903	883	848	835	869	948	945
Iowa 4-year public										
Univ. of Iowa	68	51	70	47	38	54	60	57	41	49
Univ. of Northern Iowa	63	68	42	42	49	43	30	31	39	43
Subtotal	131	119	89	89	87	97	90	88	80	92
Iowa 4-year private	145	158	150	110	108	109	106	130	114	115
Iowa 2-year private	23	23	13	14	6	9	5	6	5	2
Non-Iowa (U.S.)	422	422	409	355	321	291	296	303	299	313
Foreign	101	109	104	66	39	75	56	65	81	70
Total	1,724	1,753	1,724	1,537	1,444	1,429	1,388	1,461	1,527	1,537

*Note.* Source: ISU, 2009; beginning in 2002, transfer admissions include undergraduate only; prior to 2002, undergraduate and first professional were included.

The targeted population for this study included community college transfer students who transferred to ISU between Fall 2006 and Spring 2009. Community college transfer students pursuing bachelor degrees in STEM majors at ISU during the time of data collection were identified by the Registrar's Office at ISU and were sent e-mail invitations to participate in the study. E-mail invitations were sent to 2,811 transfer students during Spring 2009, Fall 2009, and Spring 2010. A cover letter explaining the purpose of the survey (Appendix B) accompanied the e-mail survey. Students who responded to the survey during the first round were entered into a drawing to win one of 30 gift certificates to the ISU bookstore. Students who participated in the second round were entered into a drawing to win one of 10 gift certificates to the ISU bookstore. Of the 2,811 students who were invited to participate in the study, 858 students responded, which yielded a response rate of 31%.

From the above population of 858 respondents, only Iowa community college transfer students pursuing bachelor degrees in STEM areas at the time of participation in this study were extracted. The sample for this study included 320 transfer students (99 females and 221 males), which represents 37% of the population. Table 2 shows the breakdown by gender of the semester in which the students entered ISU. Table 3 illustrates the breakdown by gender of the academic colleges of Iowa community college transfer students.

In addition to the demographics of the survey respondents, it is also essential to show the demographics of the survey nonrespondents. Seven hundred-fifteen (715) Iowa community college students in STEM did not respond to the survey and therefore were not included in this study. Table 4 highlights the majors of the nonrespondents of the TSQ. The majority of the female nonrespondents were in Animal Science (19.2%), followed closely by

students in Kinesiology and Health (16.0%). Regarding the male nonrespondents, the majority were in Agricultural Studies (11.6%) followed closely by Kinesiology and Health (10.1%). Additionally, Table 5 highlights the community college transfer GPA of the nonrespondents. The majority of the female nonrespondents had GPAs between 2.00 and 3.49. Among the male nonrespondents, the majority had GPAs between 2.00 and 2.99. The overall mean of the community college transfer GPAs of the nonrespondents was 3.0 ( $SD = 0.53$ ).

Table 2.

*Study Sample: Iowa Community College Transfers to ISU by Semester and Gender (N= 320)*

Semester entered ISU	Females		Males		Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
Fall 2006	8	8.0	32	14.5	40
Spring 2007	5	5.0	5	2.3	10
Summer 2007	1	1.0	2	.9	3
Fall 2007	30	30.3	59	26.7	89
Spring 2008	4	4.0	8	3.6	12
Summer 2008	1	1.0	5	2.3	6
Fall 2008	47	47.5	91	41.2	138
Spring 2009	3	3.0	19	8.6	22
Total	99	100.0	221	100.0	320

*Note.* Source: Personal communication, ISU Office of the Registrar, October 1, 2009.

Table 3.

*Academic Majors and Colleges of Study Sample by Gender (N= 320)*

	Female		Male	
	<i>n</i>	%	<i>n</i>	%
College of Agriculture				
Animal Ecology (A ECL)	5	5.0	11	5.0
Agricultural Studies (AG ST)	8	8.0	30	30.0
Agricultural Biochemistry (AGBIO)	1	1.0	0	0.0
Agricultural and Life Sciences Education (AGLSE)	7	7.1	2	.9
Agronomy (AGRON)	1	1.0	13	5.9
Animal Science (AN S)	12	12.0	4	1.8
Agricultural Systems Technology (AST)	1	1.0	0	0.0
Biology (BIOLA)	5	5.0	5	2.3
Dietetics (DIETA)	2	2.0	0	0.0
Dairy Science (DY S)	4	4.0	2	.9
Environmental Science (ENSCA)	0	0.0	2	.9
Forestry (FOR)	1	1.0	5	2.3
Food Science (FS A)	2	2.0	1	.5
Genetics (GEN)	0	0.0	1	.5
Horticulture (HORT)	3	3.0	7	3.2
Industrial Technology (I TEC)	0	0.0	12	5.4
Insect Science (INSCI)	0	0.0	1	.5
Microbiology (MICR)	2	2.0	0	0.0
College of Engineering				
Agricultural Engineering (A E)	0	0.0	4	1.8
Aerospace Engineering (AER E)	0	0.0	2	.9
Civil Engineering (C E)	2	20.0	7	3.2
Chemical Engineering (CH E)	0	0.0	6	2.7
Construction Engineering (CON E)	0	0.0	5	3.2
Computer Engineering (CPR E)	0	0.0	8	3.6
Electrical Engineering (E E)	0	0.0	16	7.2
Engineering Undeclared (ENGR)	0	0.0	3	1.4
Industrial Engineering (I E)	1	1.0	6	2.7

Table 3. (continued)

	Female		Male	
	<i>n</i>	%	<i>n</i>	%
College of Engineering (continued)				
Mechanical Engineering (M E)	0	0.0	34	15.4
Materials Engineering (MAT E)	0	0.0	3	1.4
Software Engineering (S E)	0	0.0	4	1.8
College of Human Science				
Dietetics (DIETH)	13	13.0	1	.5
Food Science (FS H)	1	1.0	0	0.0
Kinesiology and Health (KIN H)	12	12.0	9	4.1
Nutritional Science (NS H)	2	2.0	0	0.0
Dietetics (PDEXH)	3	3.0	0	0.0
College of Liberal Arts and Science				
Bioinformatics & Computational Biology (BCBIO)	1	1.0	0	0.0
Biochemistry (BIOCH)	1	1.0	2	.9
Biology (BIOL)	5	5.0	5	3.2
Computer Science (COMS)	0	0.0	3	1.4
Environmental Science (ENSCS)	1	1.0	1	.5
Genetics (GEN S)	0	0.0	1	.5
Geology (GEOL)	0	0.0	1	.5
Mathematics (MATH)	0	0.0	2	.9
Meteorology (MTEOR)	2	2.0	0	0.0
Pre-Computer Science (P CS)	0	0.0	1	.5
Physics (PHYS)	1	1.0	2	.9
Statistics (STAT)	0	0.0	1	.5
Chemistry (CHEM)	0	0.0	1	.5
Total	99	100.0	221	100.0

Table 4.

*Academic Majors and Colleges of TSQ Nonrespondents (N = 715)*

	Female		Male	
	<i>n</i>	%	<i>n</i>	%
College of Agriculture				
Animal Ecology (A ECL)	17	8.2	23	4.5
Agricultural Studies (AG ST)	9	4.3	59	11.6
Agricultural Biochemistry (AGBIO)	0	0.0	1	2.0
Agricultural and Life Sciences Education (AGLSE)	5	2.4	5	1.0
Agronomy (AGRON)	3	1.4	26	5.0
Animal Science (AN S)	40	19.2	15	3.0
Agricultural Systems Technology (AST)	1	0.5	6	1.2
Dairy Science (DY S)	7	3.4	4	0.8
Entomology (ENT)	0	0.0	1	0.2
Environmental Science (ENSCA)	0	0.0	6	1.2
Forestry (FOR)	5	2.4	17	3.4
Food Science (FS A)	4	2.0	1	2.0
Genetics (GEN)	3	1.4	0	0.0
Horticulture (HORT)	5	2.4	20	4.0
Industrial Technology (I TEC)	1	0.5	19	3.0
Microbiology (MICR)	7	3.4	0	0.0
College of Engineering				
Agricultural Engineering (A E)	0	0.0	14	2.8
Aerospace Engineering (AER E)	0	0.0	10	2.0
Civil Engineering (C E)	2	1.0	21	4.1
Chemical Engineering (CH E)	2	1.0	6	1.2
Construction Engineering (CON E)	0	0.0	11	2.2
Computer Engineering (CPR E)	2	1.0	15	3.0
Electrical Engineering (E E)	0	0.0	26	5.1
Engineering Undeclared (ENGR)	0	0.0	3	0.6
Industrial Engineering (I E)	0	0.0	4	0.8
Mechanical Engineering (M E)	3	1.4	48	9.5
Materials Engineering (MAT E)	0	0.0	3	0.6
Software Engineering (S E)	0	0.0	8	1.6

Table 4. (continued)

	Female		Male	
	<i>n</i>	%	<i>n</i>	%
College of Human Science				
Dietetics (DIETH)	17	8.2	4	0.8
Kinesiology and Health (KIN H)	33	16.0	51	10.1
Nutritional Science (NS H)	0	0.0	1	0.2
Dietetics (PDEXH)	1	0.5	0	0.0
College of Liberal Arts and Science				
Biochemistry (BIOCH)	4	2.0	5	1.0
Biology (BIOL)	23	11.1	25	4.0
Computer Science (COMS)	0	0.0	8	1.6
Environmental Science (ENSCS)	3	1.4	5	1.0
Geology (GEOL)	0	0.0	1	0.2
Mathematics (MATH)	2	1.0	8	1.6
Meteorology (MTEOR)	2	1.0	6	1.2
Pre-Computer Science (P CS)	1	0.5	10	2.0
Physics (PHYS)	0	0.0	4	0.8
Statistics (STAT)	2	1.0	2	0.4
Chemistry (CHEM)	1	0.5	5	1.0
Total	208	100.0	507	100.0

Table 5.

*Community College and University GPAs of TSQ Nonrespondents*

Community college transfer semester GPA	Female		Male	
	<i>n</i>	%	<i>n</i>	%
0.00–1.99	1	0.5	8	1.6
2.00–2.99	72	35.0	254	50.0
3.00–3.49	73	35.0	162	32.1
3.5 or higher	62	30.0	83	16.4

## Survey Instrument

### *Data Collection*

The survey instrument used for this study, the ISU–TSS, was administered through Qualtrics, which is an online survey software. The 132-item survey was revised from the L-TSQ survey (Laanan, 1998b), which consisted of 304 survey items. The ISU–TSS was used to collect quantitative data and open-ended responses and consisted of questions that asked the survey participants to respond to questions regarding their background characteristics, community college experiences, and university experiences (see Appendix A).

The background information section included questions regarding current place of residence, gender, age, ethnicity, highest academic degree intended to obtain, as well as parents' highest level of education and parents' total household income last year. The community college section of the survey asked students to report the number of hours per week studying and working at a job and what degree, if any, was received. This section also asked students to rate on a four-point scale their perception of general courses at the community college, academic advising/counseling services at the community college, the transfer process, course learning, learning skills, and experience with faculty. The university section of the survey asked students to report the number of hours per week working at a job, their reasons for attending ISU, what reasons influenced them to attend ISU, as well as information regarding course learning, experience with faculty, general perceptions of ISU, the adjustment process, and college satisfaction. Additionally, the survey included open-ended questions that asked students to discuss how the community college had assisted in their transition to ISU and also to provide advice to prospective transfer students.



### *Reliability and Validity*

Reliability refers to whether scores to items on an instrument are internally consistent and whether there is consistency in test administration and scoring (Creswell, 2009).

Creswell (2005) asserted that reliability is measured by item consistency and the degree to which the item responses are consistent across constructs. Additionally, reliability is defined as “the extent to which measures are free from error” (McMillan, 1996, p. 123). An exploratory factor analysis was conducted to examine the variability among variables. Constructs were then developed from the factor analysis. Coefficient alphas were calculated for each factor. This type of method is conducted when there are no right or wrong responses. The coefficient alphas are reported in Tables 6 and 10.

Validity refers to “whether one can draw meaningful and useful inferences from scores on particular instruments” (Creswell, 2009, p. 235). In other words, validity refers to the degree to which the survey items measure constructs. The quantitative section of this study was adapted from the L-TSQ (Laanan (1998a). According to Laanan (1998a), an extensive review of the literature was conducted to establish the instrument’s construct validity. A pilot test was conducted on the instrument prior to sending it to the targeted audience to ensure face validity. Psychometricians, scholars, and researchers were also consulted to validate both the content and construct of the survey instrument.

### *Study Variables*

#### *Dependent Variables*

This study had two dependent variables. A factor analysis was conducted as a data reduction technique on adjustment. A reliability test was conducted using Chronbach’s alpha to test the reliability of the factors that were developed for each dependent variable in the

factor analysis. Table 6 reports the factor loadings and the reliability coefficients of the adjustment factors that were used as dependent variables in this study: (a) academic adjustment and (b) social adjustment. The adjustment questions asked students to indicate the extent to which they agreed or disagreed with statements regarding their adjustment process on a 4-point scale: 1 = *disagree strongly*, 2 = *disagree somewhat*, 3 = *agree somewhat*, and 4 = *agree strongly* (Table 7). The coding scale for the dependent variables is listed in Table 7.

### *Independent Variables*

There were a total of 24 independent variables used in this study organized into three blocks: (a) background characteristics (block 1); (b) community college environment, which measures various community college experiences (block 2); and (c) ISU environment, which measures various university experiences at ISU (block 3).

*Background characteristics.* The purpose of this section was to extract background information from the student participants. Background characteristics have been documented as contributing to differences in academic performance (Astin, 1984, Pascarella & Terenzini, 1991). Table 8 illustrates the background demographics that were used in this study including: age, gender, race/ethnicity, father's highest education level, parents' total household income, and information regarding highest academic degree intended to obtain.

*Community college experiences.* Laanan (1996) highlighted the effects of community college experiences on transfer student achievement. The community college environment section of the hypothetical conceptual framework (Figure 3) consists of eight independent community college variables. Table 9 illustrates the community college experience independent variables used in this study and the coding scale for each variable. Community college degree status was coded on a 2-point scale with 0 = *no associate's degree*, 1 = *AA*

Table 6.

*Factor Loadings and Reliability Coefficients of Adjustment Factors (Dependent Variables)*

Factor name	$\alpha$	Adjustment questions	Factor loadings
Academic Adjustment	.613		
		• The large classes intimidate me	.727
		• I experienced a dip in grades (GPA) during my first semester	.767
		• I often feel (felt) overwhelmed with the size of the student body	.839
		• My level of stress increased when I started at ISU	.630
Social Adjustment	.845		
		• Adjusting to ISU social environment was easy	.826
		• I am very involved with social activities at ISU	.721
		• I am meeting people and making friends	.805
		• It is easy to make new friends at ISU	.807

Table 7.

*Dependent Variables*

Variable	Coding/scale (4-point scale)
Academic adjustment	1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly
Social adjustment	1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly

Table 8.

*Background Demographics Independent Variables*

Variable	Coding/scale
Age	Continuous variable
Gender	Dichotomous 0 = Female 1 = Male
Race/ethnicity	Dichotomous 0 = White 1 = Non-White
Father's higher educational level	8-point scale 1 = Elementary school or less 2 = Some high school 3 = High school graduate 4 = Some college 5 = Associate's degree from 2-year 6 = Bachelor's degree 7 = Some graduate school 8 = Graduate degree
Mother's higher educational level	8-point scale 1 = Elementary school or less 2 = Some high school 3 = High school graduate 4 = Some college 5 = Associate's degree from 2-year 6 = Bachelor's degree 7 = Some graduate school 8 = Graduate degree
Parents' total household income last year	5-point scale 1 = Less than \$20,000 2 = \$20,000–\$39,999 3 = \$40,000–\$59,999 4 = \$60,000–\$79,999 5 = \$80,000 or more
Highest degree intended to obtain at any college	5-point scale 1 = Bachelor (BA or BS) 2 = Master (MA or MS) 3 = Doctorate (Ph.D. or Ed.D.) 4 = Medical (MD, DDS, DO, or DVM) 5 = Law (JD or LLB)

Table 9

*Community College and University Experiences Independent Variables*

Variable	Coding/scale
Community college experiences	
Associate's degree obtained	Dichotomous 0 = None 1 = Associate's (AS, AAS, AGS, AA)
Transfer semester GPA	Continuous variable
Transfer semester hours	Continuous variable
Hours spent studying/preparing for classes	5-point scale 1 = up to 5 hours 2 = 6 to 10 hours 3 = 11 to 15 hours 4 = 16 to 20 hours 5 = more than 20 hours
Academic advising/counseling services (Construct: 6 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly
Experience with faculty (Construct: 6 items)	4-point scale 1 = never 2 = occasionally 3 = often 4 = very often
Course learning (Construct: 6 items)	4-point scale 1 = never 2 = occasionally 3 = often 4 = very often
General courses (Construct: 6 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly
Transfer process (Construct: 5 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly

Table 9. (continued)

Variable	Coding/scale
University experiences	
ISU GPA (as of Fall 2009)	Continuous variable
Current place of residence	Dichotomous 0= On campus 1 = Off campus
Most important reasons for attending ISU	4-point scale 1 = obtain a bachelor's degree 2 = gain skills for a new job or occupation 3 = to pursue graduate/professional school 4 = personal interest (cultural, social).
Influential reasons for attending ISU Academic advisor, friend, ISU advisor (Construct: 3 items)	4-point scale 1 = not important 2 = somewhat important 3 = important 4 = very important
Financial (Construct: 3 items)	4-point scale 1 = not important 2 = somewhat important 3 = important 4 = very important
Reputation (Construct: 3 items)	4-point scale 1 = not important 2 = somewhat important 3 = important 4 = very important
ISU-sponsored transfer student orientation	Dichotomous 0 = no 1 = yes
Course learning (Construct: 6 items)	4- point scale 1 = never 2 = occasionally 3 = often 4 = very often
Experience with faculty at ISU (Construct: 6 items)	4-point scale 1 = never 2 = occasionally 3 = often 4 = very often

Table 9. (continued)

Variable	Coding/scale
General perceptions of ISU faculty (Construct: 3 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly
General perception of transfer students by ISU (Construct: 4 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly
Overall satisfaction at ISU (Construct: 4 items)	4-point scale 1 = disagree strongly 2 = disagree somewhat 3 = agree somewhat 4 = agree strongly

(Associate of Arts), AS (Associate of Science), AAS (Associate of Applied Sciences) or AGS (Associates of General Studies). Community college GPA and the number of credit hours obtained at the time of transfer were continuous variables. Hours spent studying or preparing for classes was coded on a 5-point scale with 1 = *up to 5 hours*, 2 = *6 to 10 hours*, 3 = *11 to 15 hours*, 4 = *16 to 20 hours*, and 5 = *more than 20 hours* (Table 9).

The additional five community college independent variables are constructs. A factor analysis was conducted on the related survey items. This statistical technique identifies factors that can be used to represent relationships among sets of many interrelated variables. Factor loadings and Chronbach's alpha tests were used to test the reliability of the factors that were developed in the factor analysis, which is reported in Table 10. The five community college constructs are academic advising/counseling services, experience with faculty, course learning, general courses, and transfer process. Academic advising/counseling

services, general courses, and transfer process were measured on a 4-point scale: 1= *disagree strongly*, 2 = *disagree somewhat*, 3 = *agree somewhat*, and 4 = *agree strongly*. The last two independent variables, experience with faculty and course learning, were coded on a 4-point scale: 1= *never*, 2= *occasionally*, 3 = *often*, and 4= *very often*.

*University experiences.* The ISU environment section of the hypothetical conceptual framework (Figure 3) consists of 10 independent variables. Table 9 illustrates the 11 university experience independent variables in this study and the coding scale for each variable. Current place of residence, which depicts students' place of residence during the academic year, was originally coded on a 5-point scale with 1 = *residence halls or other university housing*, 2 = *fraternity or sorority house*, 3 = *private apartment or room within walking distance of the university*, 4 = *house, apartment, etc. (not walking distance from campus)*, and 5 = *with parents or relatives*, but was recoded on a dichotomous scale of 0 = *on campus* and 1 = *off campus*.

Most important reasons for attending ISU were coded on 4-point scale with 1 = *to obtain a bachelor's degree*, 2 = *to gain skills necessary to enter a new job or occupation*, 3 = *to pursue graduate or professional school*, and 4 = *to satisfy a personal interest (cultural, social)*. ISU-sponsored transfer student orientation is a dichotomous variable and was measured with 0 = *yes* and 1 = *no*.

Eight of the university independent variables are constructs. A factor analysis was conducted on the survey items. Factor loadings and Chronbach's alpha tests were used to test the reliability of the factors that were developed in the factor analysis, which is reported in Table 10. Three university constructs, influential reasons for attending ISU—academic advisor, friend, ISU advisor; influential reasons for attending ISU—financial; and influential



Table 10.

*Factor Loadings and Reliability Coefficients of Community College and University Experiences Independent Variables*

Factor name	Factor loadings
Community College Experiences	
Academic Advising/Counseling Services, $\alpha = .934$	
Consulted with advisors/counselors before transferring	.839
Information received from advisors/counselors was helpful	.778
Met with advisor/counselors on a regular basis	.778
Talked with advisor/counselor about courses, requirements, and plans	.859
Discussed plans with an advisor/counselor on transferring to a 4-year institution	.844
Advisor/counselor identified courses for general/major requirements of 4-year	.809
Experience with Faculty, $\alpha = .906$	
Visited faculty/sought advice on class projects	.781
Felt comfortable approaching faculty outside of class	.649
Asked instructor for information related to courses taken	.823
Visited informally and briefly with an instructor after class	.804
Discussed career plans/ambitions with a faculty member	.822
Asked my instructor for comments and criticisms about my work	.746
Course Learning, $\alpha = .832$	
Took detailed notes in class	.559
Participated in class discussions	.546
Tried to see how different facts and ideas fit together	.790
Thought about practical applications of the material	.694
Integrated ideas from various sources on a paper/project	.511
Tried to explain material to another student or friend	.500
General Courses, $\alpha = .870$	
Courses developed my critical/analytical thinking	.682
Courses demanded intensive writing assignments/projects	.546
Courses were intellectually challenging	.790
Courses prepared me for academic standards at ISU	.694
Courses prepared me for my major at ISU	.511
Courses required extensive reading and writing	.500
Transfer Process, $\alpha = .755$	
Researched aspects of ISU for better understanding of environment/academic expectations	.694
Knew what to expect at ISU in terms of academics	.546
Visited ISU campus to learn where offices and departments were located	.796
Spoke to an academic counselor at ISU about transfer and major requirements	.818
Visited the admission office at ISU	.681

Table 10. (continued)

Factor name	Factor loadings
University experiences	
Course Learning, $\alpha = .832$	
Took detailed notes in class	.586
Participated in class discussions	.525
Tried to see how different facts and ideas fit together	.819
Thought about practical applications of the material	.850
Integrated ideas from various sources on a paper/project	.647
Tried to explain material to another student or friend	.614
Experience with Faculty, $\alpha = .918$	
Visited faculty/sought advice on class projects	.802
Felt comfortable approaching faculty outside of class	.795
Asked instructor for information related to courses taken	.806
Visited informally and briefly with an instructor after class	.857
Discussed my career plans and ambitions with a faculty member	.844
Asked my instructor for comments and criticisms about my work	.881
Influential reasons for attending	
Outside Influences $\alpha = .699$	
Advised by academic counselor(s) at previous college	.644
A friend suggested attending	.674
ISU representative recruited me	.774
Financial, $\alpha = .833$	
I was offered financial assistance	.733
ISU has affordable tuition	.816
Cost of ISU	.751
Reputation, $\alpha = .779$	
ISU's graduates get good jobs	.825
ISU's ranking in national magazines	.769
ISU's academic reputation	.683
General perceptions	
Faculty, $\alpha = .793$	
ISU faculty are easy to approach	.827
ISU faculty tend to be accessible to students	.852
Professors are strongly interested in academic development of undergraduates	.846
Negative Experiences as a Transfer Student, $\alpha = .756$	
Students underestimate my abilities because I am a transfer student	.720
There is a stigma at ISU having started at a community college	.802
Do not fit in	.725
Treated like a number	.759

Table 10. (continued)

Factor Name	Factor loadings
Overall Satisfaction of ISU, $\alpha=.911$	
Courses at ISU have been interesting and worthwhile	.829
ISU is an intellectually stimulating and often exciting place to be	.824
I would recommend to other transfer students to come to ISU	.854
If I could start over again, I still would go to ISU	.819

reasons for attending ISU—reputation, were coded on a 4-point scale with 1 = *not important*, 2 = *somewhat important*, 3 = *important*, and 4 = *very important*. Two constructs, course learning, and experience with faculty, were coded on a 4-point scale with 1 = *never*, 2 = *occasionally*, 3 = *often*, and 4 = *very often*. The final three university constructs, general perception of faculty, general perceptions of transfer students (negative), and overall satisfaction, were coded on a 4-point scale with 1 = *disagree strongly*, 2 = *disagree somewhat*, 3 = *agree somewhat*, 4 = *agree strongly*.

#### *Data Analysis*

Figure 3 shows the hypothetical conceptual framework of transfer students' socialization that was used in this study. The first block of variables is the background characteristics: gender, parents' highest educational level, parents' total household income, and highest degree intended to obtain. The second block represents the community college environment. The third block represents the university environment. The dependent variables in this study were academic adjustment and social adjustment.

Descriptive, comparative, and inferential statistical analyses were conducted on the quantitative data collected from the ISU–TSS in order to understand the profiles of the

transfer students in the study and the overall community college and university experiences of community college transfer students in STEM majors. Table 11 lists each research question with the statistical analysis that was conducted. The open-ended responses were analyzed in the same manner as the semistructured interview responses, as discussed later in the chapter.

Table 11.

*Research Questions, Variables, and Method of Analysis*

Research question	Independent variables	Dependent variables	Method of analysis
1. What are the background characteristics of Iowa community college transfer students in STEM majors at ISU by gender?	<ul style="list-style-type: none"> <li>• Background characteristics</li> </ul>		Descriptive
2. What are the community college and university experiences of ISU community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?	<ul style="list-style-type: none"> <li>• Community college experiences</li> <li>• ISU experiences</li> </ul>		Descriptive
3. Are there statistically significant differences in the community college and university experiences by gender?	<ul style="list-style-type: none"> <li>• Background characteristics</li> <li>• Community college experiences</li> <li>• ISU experiences</li> </ul>	<ul style="list-style-type: none"> <li>• Social adjustment</li> <li>• Academic adjustment</li> </ul>	(Inferential) <i>t</i> tests
4. What background characteristics, community college and ISU experiences predict academic and social adjustment for community college transfer students in STEM majors at ISU?	<ul style="list-style-type: none"> <li>• Background characteristics</li> <li>• Community college experiences</li> <li>• ISU experiences</li> <li>• Community college preparation</li> <li>• ISU academic preparation</li> </ul>	<ul style="list-style-type: none"> <li>• Social adjustment</li> <li>• Academic adjustment</li> </ul>	Multivariate analysis

### *Descriptive Statistics*

*Research question 1.* Descriptive statistics were used to answer research question 1: “What are the background characteristics of Iowa community college transfer students in STEM majors at ISU by gender?” In particular, the frequencies and percentages were reported to show the background characteristics of the sample. The background information included gender, ethnicity, mother’s highest level of education, father’s highest level of education, parental income level, and highest degree intended to obtain by gender. The purpose of this analysis was to explore the background characteristics of the community college transfer students who pursue bachelor degrees in STEM majors at ISU.

*Research question 2.* Descriptive statistics were employed to address research question 2: “What are the community college and university experiences of ISU community college transfer students pursuing bachelor degrees in STEM majors at ISU by gender?” In particular, the frequencies, percentages, and percent differences were reported to show the community college and university experiences of the students. The community college experiences include community college GPA, the number of credit hours obtained at the time of transfer, the degree obtained at the community college, hours spent studying or preparing for class, general courses, academic advising/counseling services, transfer process, course learning, experience with faculty, and current place of residence. The university experiences include influential reasons for attending (e.g. reputation, financial, and community college advisors, friends, and ISU advisors), participation in an ISU-sponsored transfer student orientation, how helpful orientation was to students, ISU GPA (as of Fall 2009), course learning, experience with faculty at ISU, general perceptions of ISU faculty, negative perception of transfer students, ISU courses, and overall satisfaction at ISU.

### *Inferential Statistics*

*Research question 3.* Inferential statistic analyses were conducted to answer research question 3: “Are there statistically significant differences in the community and university experiences by gender?” Inferential statistics can be used to make inferences of generalizations about a population (Alreck & Settle, 1985). Independent sample *t* tests were conducted to compare the mean scores of two groups’ (gender) community college experience variables (community college transfer GPA, community college academic advising, community college experience with faculty, community college course learning, community college general courses, community college transfer process, and the community college hours spent studying and preparing for class) and university experience variables (ISU general perception of experience with faculty; general perception of course learning; general perception of transfer student [negative]; influential reason for attending ISU—reputation; influential reason for attending ISU—financial; influential reason for attending ISU—community college advisor, friend, ISU advisor; general perception of courses and campus; and general perception of faculty and student services). Because the sample sizes for the two groups were not equal, the Levene’s test for equality of variances—equal variances assumed was conducted to test the second assumption of approximately equal variances. The *p* values in the Levene’s test were compared with a critical value of .05 for all analyses. If the *p* value of the Levene’s test was less than or equal to the alpha level of .05, then the null hypothesis, that the variances of the two groups are equal, was rejected, which implies that the variances are unequal. However, if the *p* value of the Levene’s test was larger than the alpha level of .05, then the null hypothesis was not rejected. That is, the variances of the two groups are equal, implying that the variances are equal.

The significance value (2-tailed) was used to determine the significance of the relationship. If  $p \leq .05$ , then the null hypothesis was rejected, signifying a statistically significant relationship. If  $p > .05$ , the null hypothesis was not rejected, implying no sufficient evidence existed to signify a statistically significant relationship. The null hypotheses of no existing relationships were rejected for  $p$  values above .05.

### *Multivariate Analysis*

*Research question 4.* Multivariate analysis was used to address the fourth research question: “What background characteristics, community college, and ISU experiences predict academic and social adjustment for community college transfer students in STEM majors?” Multivariate regression was used to estimate the coefficient for the various independent variables used to best predict the value of the dependent variables (social adjustment and academic adjustment). The following multiple regression equation was used:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

Two sequential hierarchical regression models reflecting the two dependent variables (academic and social dependent) were used following the above equation. Using sequential multiple regression, also called block regression, independent variables may be entered into the regression model in a selected order. This type of strategy makes it possible to enter variables that are “causally prior” into the model before other variables (Tabachnick & Fidell, 2007). Thus, the contribution that each set of independent variables makes to the model can be assessed at its point of entry. Figure 4 shows the regression model that takes into account community college and university factors that predict social adjustment. Block entry method was used with background demographics (block 1), community college environment (block 2), and ISU environment (block 3). Figure 5 shows the regression model

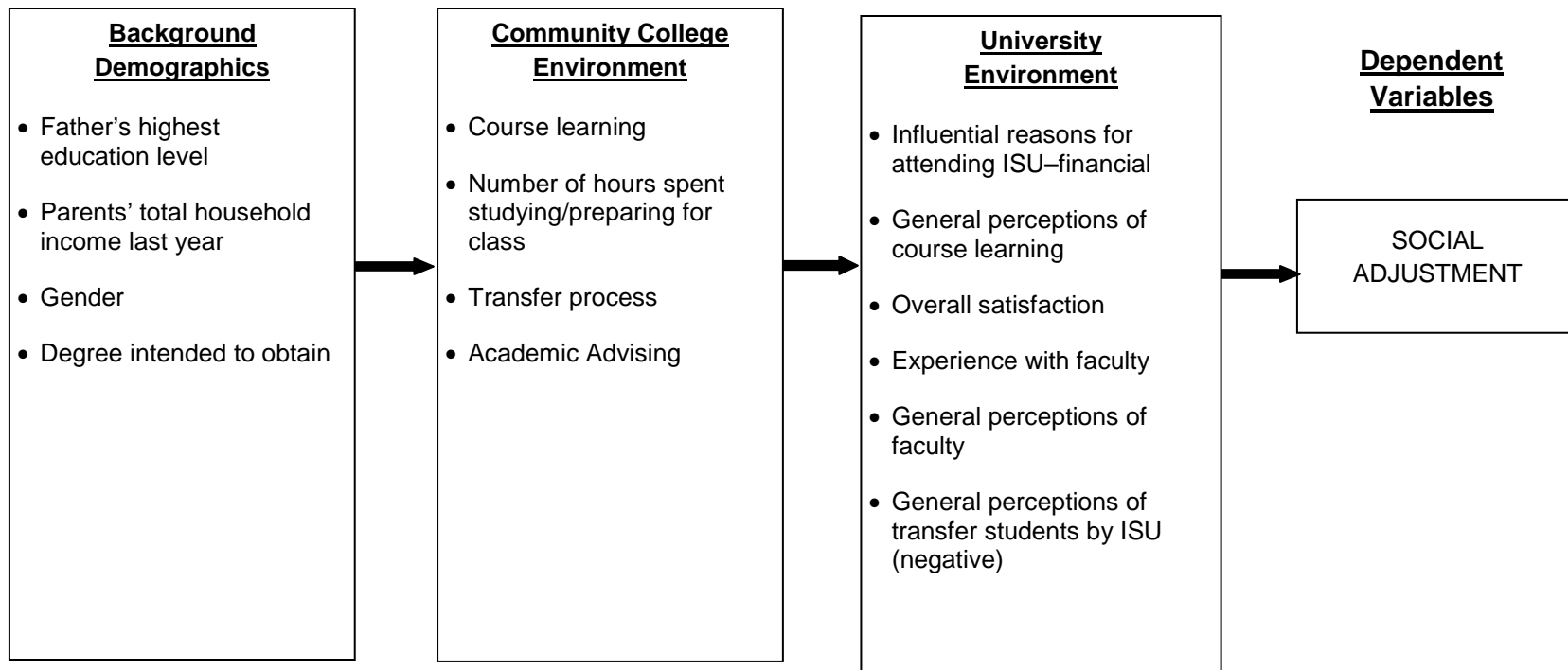


Figure 4. Predictive model regression analysis: social adjustment (sequential hierarchical regression model).



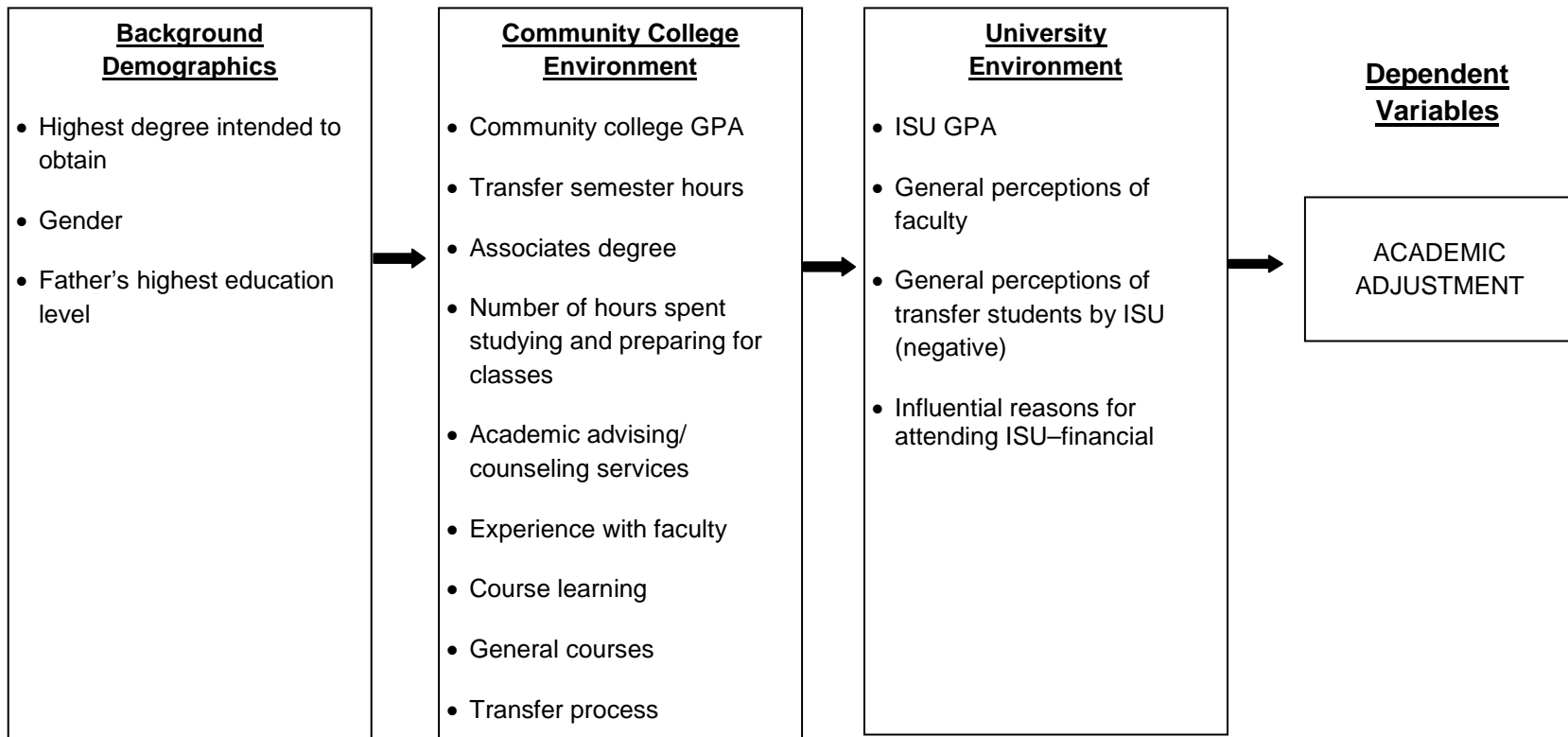


Figure 5. Predictive model regression analysis: academic adjustment (sequential hierarchical regression model).

that takes into account community college and university factors that predict academic adjustment. The regression models allowed the examination of how well one or more of independent variables predict the independent variable.

One assumption of multiple regression is that the residuals are normally distributed. This means that the difference between the predicted and obtained scores is normally distributed. The normal curve was plotted to assess the deviation from the expected value for each x value in the model. Tests of correlation were run on all independent variables to check for multicollinearity among the independent variables. The low standard error for the variables means the assumption of multicollinearity was met.

### Qualitative Component

The data for the qualitative component of the study came from two sources: open-ended questions on the survey and the semistructured interviews.

#### *Semistructured Interviews*

The research question “How do community college transfer students describe their overall socialization experiences in STEM” was best answered by a qualitative approach; thus, semi-structured interviews were carried out. Creswell (2009) defined qualitative research as a form of interpretive inquiry, as a means “for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (p. 232). Qualitative methodology helps to unearth “how people make sense of their lives, what they experience, how they interpret these experiences, [and] how they structure their social worlds” (Merriam, 2002, p. 19). The use of semistructured interviews allowed the experiences of women pursuing masculine-dominated fields of study to be explored. Additionally, this methodology

allowed the participants to interpret and make meaning of their pre- and posttransfer socialization experiences, including the people, places, and events, in their own voices.

Qualitative work using Weidman's (1987) undergraduate socialization framework allowed me to investigate the experiences of female community college transfer students who were pursuing STEM bachelor degrees. The theoretical frameworks allowed me to explore the focus of the experiences of the female participants and interpret them from the perspective of the female participants.

### *Participants*

The selection of the interview participants was obtained using purposive sampling. Purposive sampling enables "detailed exploration and understanding of the central themes and puzzles which the researcher wishes to study" (Ritchie & Lewis, 2003, p. 78). For this reason, potential interviewees were sent e-mail invitations to participate in the semistructured interviews. The ISU-TSS had a question that asked individuals to express their interest in further participation in interviews and focus groups. The e-mail invitations were sent only to females who had indicated an interest via the ISU-TSS. The participants were chosen based on the survey responses to ensure that they would provide information relative to the research questions and focus of this study. Only female transfer students currently pursuing a STEM bachelor's degree at ISU were contacted. A total of 5 female students were interviewed.

### *Data Collection*

Marshall and Rossman (1995) described phenomenological interviewing as "a specific type of in-depth interviewing grounded in the theoretical tradition of phenomenology" (p. 82). The purpose of phenomenological interviewing is to "describe the meaning of a concept or phenomenon that several individuals share" (Marshall & Rossman,

2006). Interviewing is considered the main method of data collection in phenomenological research. During this process, the experiences and descriptions of the interviewees can be explored and lightly probed (Kvale, 1996). Jasper (1994) suggested interview skills that are essential apply “the use of reflection, clarification, requests for examples and description and the conveyance of interest through listening techniques” (p. 311). The primary advantage of phenomenological interviewing is that “it permits an explicit focus on the researcher’s personal experience combined with those of the interviewees” (Marshall & Rossman, 2006, p. 105). This type of interviewing really allows the researcher to become one with the interviewees.

Lincoln and Guba (1985) provided certain steps involved in the interview process. First, the researcher must identify interview participants. Second, the researcher must rehearse the interview questions and the order in which each question will be asked. Third, the interviewee must be briefed on the information contained in the informed consent document. Fourth, the interview must be semistructured in nature, allowing the interview to progress naturally. An interview protocol was developed to guide the interviewing process in this study. The protocol consisted of working topics and questions. Probing questions were used as needed to obtain as much rich data as possible.

Each interviewee participated in a 1-hour semistructured interview conducted in March 2010. Semistructured interviews are designed to “to explore a topic more openly and to allow interviewees to express their opinions and ideas in their own words” (Esterberg, 2002, p. 87). The interview was guided by an interview protocol, which consisted of semistructured questions. Each interview was audiotape recorded and transcribed.

### *Data Analysis*

The data were analyzed in two phases. First, a narrative approach (Clandinin & Connelly, 2000) was used to tell each participant's individual story and to uncover subtle nuances in order to gain a deeper understanding of how female transfer students described their overall socialization experiences. Second, themes were developed across all five individual interviews.

Creswell (2009) viewed data analysis as an interactive process and drew attention to six steps in the analysis in qualitative research. The first step is to organize and prepare data for analysis. The second step involves reading through all the data and the third step begins the detailed analysis with a coding process. To “get a sense of the whole,” all of the transcripts were carefully read once without taking notes (Creswell, 2009, p. 186). Coding is the organizing of interview information into “chunks or segments of text before bringing meaning to information” (Rossman & Rallis, 1998). The “codes [are] allowed to emerge during data analysis” (Creswell, 2009, p.187). The fourth step in the process is to generate descriptions from the coding process, and the fifth step is to explain how the themes will be represented in the findings; and lastly, the sixth step is interpreting the data. The above steps were carried out in the analysis of the open-ended survey questions and the interviews.

### *Ethical Considerations*

Approval for the use of human subjects was obtained through the Institutional Review Board (IRB) at ISU before any information was obtained (see Appendix C). The researcher is aware of the sensitive nature of this data and complied with all restrictions on the use of data containing important information. No student data were reported without aggregating the results to maintain anonymity of the individuals.

### Limitations of the Study

A secondary dataset was used for this study. As a result, some of the limitations result from the nature of these datasets. This study did not seek to account for all variables that impact the academic and social adjustment of community college transfer students. For example, information regarding precollegiate activities and hobbies related to STEM fields were not accounted for in the quantitative data.

The quantitative and qualitative data in this study were self-reported. Students often choose not to report and/or choose only to respond to certain survey items. The decision of a student to not respond limited the findings of the study to only those students who chose to respond to all of the survey questions. Additionally, the quantitative and qualitative findings were limited to the recollection of past experiences of the transfer students. This reflection may have caused some inaccuracies of students' "real-time experiences."

### Delimitations of the Study

In addition to the limitations of the study that were caused by the nature of the datasets, decisions were also made to delimit the study. First, this study is delimited to the Iowa context in which it was conducted. The findings of this study are limited to those of traditional aged, White Iowa students in the Midwest. The findings of this study can be generalized only to students of the same demographics and background characteristics. Therefore, the experiences of students of color may be different. Although the study may have implications for those in other states, it is not intended to be generalized beyond its immediate context. Transfer students attending institutions in states other than Iowa may have different experiences. It was also decided that the study would focus on individuals who transferred from Iowa community colleges. Additionally, this study was delimited to students

pursuing bachelor's degrees in STEM majors. Consequently, this study is delimited to Iowa community college transfer students who are pursuing bachelor degrees in STEM majors at ISU. The qualitative component of this study is delimited to female Iowa community college transfer students who expressed an interest via the L-TSQ.

### Summary

Chapter 3 highlighted the methodological approach employed in this study. This chapter outlined the research questions, hypothesis, research design, setting, population and sample, data collection, instrumentation, variables, data management, and method of analysis for both the quantitative and qualitative sections of the study. The chapter concluded with information regarding the ethical considerations and delimitations and limitations of the study.

## CHAPTER 4. FINDINGS

### Overview

This chapter provides an overview of the quantitative and qualitative findings of this study and is organized into five sections. This first section provides a comprehensive reporting of the background characteristics of community college transfer students. The descriptive reporting includes the transfer community colleges of the participants, father's highest education level, mother's highest education level, parental income, and highest degree intended to obtain. This section also includes a descriptive reporting of the community college and university experiences. Frequencies and percentages are reported for each of the above sections. Percent differences between genders are also reported for transfer students' community college experiences and university experiences (Tables 12 and 13). The second section reports a statistical analysis of community college and university experiences by gender. The third section reports the results of the sequential hierarchical regression analysis of the two dependent variables: social adjustment and academic adjustment. The fourth section highlights the findings from the open-ended questions. Lastly, the fifth section reports the findings from the qualitative interviews.

### Descriptive Analysis of Overall Sample

In an effort to respond to research questions 1 and 2, which asked for a description of background characteristics and of community college and university experiences of transfer students, descriptive statistics are provided. Table 12 reports the Iowa community colleges represented in this study. The sample includes the frequencies and percentages of transfer students at each community college by gender. The highest percentage of students in the sample transferred from DMACC–Ankeny (46.2%,  $n = 75$ ),



Table 12.

*Iowa Community College Transfers at ISU by Gender (N = 320)*

Community college	Female ( <i>n</i> = 99)		Male ( <i>n</i> = 221)	
	<i>n</i>	%	<i>n</i>	%
Clinton Community College	1	1.0	3	1.4
Des Moines Area Community College– Ankeny	22	22.2	53	24.0
Des Moines Area Community College–Boone	6	6.1	8	3.6
Des Moines Area Community College–Carroll	0	0.0	1	.5
Des Moines Area Community College–Urban	2	2.0	1	.5
Des Moines Area Community College–West	1	1.0	3	1.4
Ellsworth Community College	7	7.1	8	3.6
Hawkeye Community College	6	6.1	16	7.2
Indian Hills Community College– Centerville	1	1.0	2	.9
Indian Hills Community College–Ottumwa	1	1.0	4	1.8
Iowa Central Community College–Fort Dodge	2	2.0	15	6.8
Iowa Lakes Community College–Emmetsburg	1	1.0	3	1.4
Iowa Lakes Community College–Estherville	2	2.0	5	2.3
Iowa Western Community College–Clarinda	0	0.0	2	.9
Iowa Western Community College–Council Bluffs	3	3.0	12	5.4
Kirkwood Community College– Iowa City	19	19.2	80	36.2
Marshalltown Community College	2	2.0	5	.0
Muscatine Community College	1	1.0	3	1.4
North Iowa Area Community College	3	3.0	12	5.4
Northeast Iowa Community College–Calmar and Peosta	8	8.1	6	2.8
Northeast Iowa Community College	1	1.0	2	.9
Scott Community College	4	4.0	5	2.3
Southeastern Community College	3	3.0	5	2.3
Southwestern Community College	1	1.0	4	1.8
Western Iowa Tech Community College	2	2.0	3	1.4
Total	99	100.0	221	100.0

followed by Kirkwood Community College (36.3%,  $n = 58$ ), and Hawkeye Community College (13.3%,  $n = 22$ ). A total of 320 students (99 females and 221 males) who participated in this study transferred from Iowa community colleges between Fall 2006 and Spring 2009 (Table 10).

### *Background Characteristics*

In order to gain a better understanding of the background characteristics of Iowa community college transfer students who transferred to ISU, a detailed description of the background characteristics are presented in Table 13.

#### *Gender, Age, and Race/Ethnicity*

Thirty-one percent of the population was female and 69.0% of the population was male students. In terms of age, 78.8% of the female students were 20 years of age or younger and 78.7% of the male students were 20 years of age or younger. Regarding race and ethnicity, 94% of the female students were White and 86% of the male students were White.

#### *Parents' Education and Income Levels*

Regarding the highest level of highest education completed by the mother, the majority of the students had mothers who had obtained at least a high school diploma (Table 13). One third of the females (33.3%) had mothers who had obtained at least a high school diploma, and a little over one fourth (27.4%) of males had mothers who had obtained at least a high school diploma. Over one fourth (26.0%) of the mothers of the male participants had completed a bachelor's degree compared with a little more than one tenth (12.5%) of the mothers of the female students. A small percentage of both females (6.3%) and males (5.6%) had mothers who had completed a graduate degree.

Table 13.

*Transfer Students' Background Characteristics by Gender (N = 320)*

Variable	Female		Male	
	<i>n</i>	%	<i>n</i>	%
Gender	99	31.0	221	69.0
Age				
20 or younger	78	78.8	174	78.7
21-24 years old	0	0.0	0	0.0
25-29 years old	3	3.0	2	.9
30-35 years old	1	1.0	3	1.4
36-45 years old	0	0.0	1	.5
46-56 years old	0	0.0	0	0.0
Did not report	17	17.0	41	19.0
Race/Ethnicity				
White	93	94.0	190	86.0
Non-White	6	6.0	31	14.0
Highest level of education completed by your mother				
Elementary school or less	1	1.0	2	0.9
Some high school	0	0.0	6	2.8
High school graduate	32	33.3	59	27.4
Some college	17	17.7	34	15.8
Associate's degree from two year	24	25.0	43	20.0
Bachelor's degree	12	12.5	56	26.0
Some graduate school	4	4.2	3	1.4
Graduate degree	6	6.3	12	5.6
Don't know	0	0.0	0	0.0
Highest level of education completed by your father				
Elementary school or less	2	2.1	2	0.9
Some high school	5	5.2	3	1.4
High school graduate	31	32.0	76	35.2
Some college	22	22.7	44	20.4
Associate's degree from 2-year college	13	13.4	34	15.7
Bachelor's degree	15	15.5	44	20.4
Some graduate school	1	1.0	2	0.9
Graduate degree	7	7.2	10	4.6
Don't know	1	1.0	1	0.5
Parents total household income last year				
Less than \$20,000	2	2.6	8	4.1
\$20,001–\$39,999	14	17.9	26	13.3
\$40,000–\$59,999	22	28.2	66	33.8
\$60,000–\$79,999	20	25.6	44	22.6
\$80,000 or more	20	25.6	51	26.2

Table 13. (continued)

Variable	Female		Male	
	<i>n</i>	%	<i>n</i>	%
Highest academic degree intended to obtain				
Bachelor (BA or BS)	49	50.0	124	57.4
Master (MA or MS)	31	31.6	55	25.5
Doctorate (Ph.D or Ed.D)	7	7.1	24	11.1
Medical (MD, DDS, DO, orDVM)	9	9.2	7	3.2
Law (JD or LLB)	2	2.0	0	0.0
Other	0	0	6	2.8

Regarding the highest level of education completed by the father, the majority of the students had fathers who had obtained at least a high school diploma. About one third of the females (32.0%) and males (35.2%) had fathers whose highest level of education was at least a high school diploma. About one fifth of the fathers of females (22.7%) and males (20.4%) had attended college. More fathers of male students (20.4%) completed a bachelor degree as compared to female students' fathers (15.5%).

Table 13 also reports the parental income levels of the transfer students by gender. The majority of the parents of the transfer students had average income levels. More specifically, the parental income level of about one fourth of the females (28.2%) and one third of the males (33.8%) was between \$40,000 and \$59,999, followed by parental income levels of between \$60,000 and \$79,999 for about one fourth of the females (25.6%) and males (22.6%). A larger percentage of males (26.2%) had parental income levels of \$80,000 or more as compared to a little over one fourth (25.6%) for females' parental income levels.

#### *Highest Academic Degree Intended to Obtain*

Regarding the academic degree intended to obtain, at least half of both female (50%) and male students (57.4%) intended to obtain a bachelor's degree. A little less than one third

of females (31.6%) and a little over one fourth of males (25.5%) aspired to obtain a master's degree. More males (11.1%) than females (7.1%) intended to obtain a doctorate degree in their respective academic areas.

### *Summary of Background Characteristics*

1. Thirty-one percent of the sample was females and 69% of the sample were males.
2. A majority of the female (78.8%) and males (78.7%) in this study were 20 years old or younger.
3. A vast majority (94%) of the sample were White females and 86% of the sample were White males.
4. The largest percentage of females (22.2%) and males (24.0%) transferred from DMACC during Fall 2006 and Fall 2009.
5. The largest percentage of fathers of both females (32.0%) and males (35.2%) had a high school diploma as the highest education level achieved.
6. The parental income level of the largest percentage of both females (28.2%) and males (33.8%) was between \$40,000 and \$59,999.
7. At least half of both females (50.0%) and males (57.4%) aspired to obtain at least a bachelor's degree.

### *Community College Experiences*

Table 14 reports the community college experiences of Iowa community college transfer students by gender. The majority of both female students (53.5%) and male students (65.2%) did not complete an associate's degree.

In terms of the transfer semester GPA, the largest percentage of the female students (39.4%) transferred with a GPA of 3.5 or higher. However, the largest percentage of male

Table 14.

*Transfer Students' Community College Experiences by Gender (N = 320)*

Variable	Female (n = 99)		Male (n = 221)		Difference <sup>a</sup>
	n	%	n	%	
Associate's degree obtained					
Associate's (AA, AS, AAS, AGS)	46	46.5	144	34.8	11.7
None	53	53.5	77	65.2	-11.7
Transfer semester GPA					
2.00–2.99	25	25.3	77	34.8	-9.5
3.00–3.49	35	35.4	75	34.0	1.4
3.5 or higher	39	39.4	69	31.0	8.4
Transfer semester hours					
1–49 hours	20	20.0	54	24.4	-4.4
50–100 hours	75	75.6	164	74.0	1.6
Over 100 hours	4	4.4	3	1.4	3.0
Hours spent studying and preparing for class					
1–5 hours	38	38.4	103	46.6	-8.2
6–10 hours	33	33.3	58	26.2	7.1
11–15 hours	15	15.2	22	10.0	5.2
16–20 hours	4	4.4	13	5.9	-1.5
More than 20 hours	1	1.0	9	4.1	-3.1
Academic advising					
Disagree strongly	8	8.1	15	6.8	1.3
Disagree somewhat	13	13.1	33	14.9	-1.8
Agree somewhat	36	36.1	83	37.6	-1.5
Agree strongly	32	32.1	68	30.8	1.3
Experience with faculty					
Never	0	0.0	5	2.5	-2.5
Occasionally	21	24.4	54	27.0	-2.6
Often	37	43.0	88	44.0	-1.0
Very Often	28	32.6	53	26.5	6.1
Course learning					
Never	0	0.0	2	1.0	-1.0
Occasionally	2	2.4	14	7.1	-4.7
Often	38	45.2	104	52.5	-7.3
Very Often	44	52.4	78	35.3	17.1
General courses					
Disagree strongly	1	1.1	1	0.5	0.6
Disagree somewhat	10	11.0	32	15.9	-4.9
Agree somewhat	50	54.9	104	51.7	3.2
Agree strongly	30	33.0	64	31.8	1.2

Table 14. (continued)

Variable	<u>Female (n = 99)</u>		<u>Male (n = 221)</u>		<u>Difference<sup>a</sup></u>
	<i>n</i>	%	<i>n</i>	%	%
Transfer process					
Disagree strongly	1	1.0	3	1.4	-0.4
Disagree somewhat	11	11.1	22	10.0	1.1
Agree somewhat	44	44.4	114	51.6	-7.2
Agree strongly	34	34.3	66	30.0	4.3

<sup>a</sup>Difference was calculated by subtracting males from females. A positive percentage indicates a higher percentage for females.

students (34.8%) transferred with a GPA of 2.00–2.99. A little over one third of both the females (35.4%) and males (34.0%) transferred with a GPA of 3.00–3.49. The overall mean of the respondents' community college GPAs was 3.2 (SD = 0.50).

Regarding transfer semester hours, about three fourths of both female (75.6%) and male (74.0%) students transferred with 50–100 credit hours. A little over one fifth of both female (20.0%) and male (24.4%) students transferred with 1–49 credit hours.

Regarding time spent studying/preparing for class, over three fourths of the students (78.1% of females and 76.4% of males) spent between 1 and 10 hours studying per week. Of the sample, 20.9% of females and 15.9% of males spent between 11 and 20 hours per week studying for class, and only about 1% of females and 4.1% of males spent more than 20 hours per week studying.

In terms of the academic advising/counseling services construct, over three fourths of the students (76.4% of females and 75.9% of males) agreed somewhat or agreed strongly to having consulted or talked with advisors or counseling services regarding transferring. Only about one fourth of students (25.6% of females and 24.1% of males)

disagreed strongly or disagreed somewhat with having interacted with academic advisors and counseling services.

In terms of the experience with faculty construct, the majority of the students interacted with faculty on some level and felt comfortable approaching faculty. Approximately three fourths of both females (75.6%) and males (70.5%) often or very often interacted with and felt comfortable approaching faculty. Only about one fourth of females (24.4%) and males (27.0%) occasionally interacted with and felt comfortable approaching faculty members.

In relation to the course learning construct, a large majority of both females (97.6%) and males (87.8%) often or very often took notes and engaged in class activities, projects, and class discussions. Less than 10% of females (2.4%) and males (7.1%) only occasionally took notes and engaged in classroom activities and discussions.

Regarding the general courses construct, a large majority of both females (87.9%) and males (83.5%) agreed somewhat or agreed strongly that general courses were intellectually challenging, extensive, and prepared them for ISU courses. Less than one fifth of both females (12.1%) and males (16.4%) disagreed strongly or disagreed somewhat that general courses were intellectually challenging, extensive, and prepared them for ISU courses.

In terms of the transfer student construct, the majority of the students were proactive regarding the transfer process. Over three fourths of both females (78.8%) and males (81.6%) agreed somewhat or agreed strongly to researching and visiting the ISU campus to learn more about the campus prior to transferring. Less than 20% of both females (17.8%) and males (15.2%) disagreed strongly or disagreed somewhat to reaching and visiting the ISU campus prior to transferring.



*Summary of Community College Experiences*

1. In terms of place of residence, over half of both the females (77.0%) and males (71.0%) lived on campus.
2. Regarding associate's degree completed, the majority of females (53.5%) and males (65.2%) did not complete an associate's degree prior to transferring.
3. One third of females had transferred with a B average, whereas one third of males had transferred with a C average.
4. The majority of both females and males completed between 50 and 100 credit hours prior to transferring.
5. Regarding place of residence during the academic year, the majority of both females (57.1%) and males (51.2%) lived on campus.
6. In terms of hours spent studying and preparing for class, the majority of both females (71.7%) and males (72.8%) had spent between 1 and 10 hours per week studying and preparing for class.
7. In relation to the academic advising and counseling services construct, the majority of females (68.2%) and males (68.4%) had consulted with academic advisors and counseling services regarding transferring and the transfer process.
8. Regarding the experience with faculty construct, the majority of both females (75.6%) and males (70.5%) reported they often or very often interacted with and felt comfortable approaching faculty.
9. In terms of the course learning construct, the majority of both females (97.6%) and males (87.8%) often/very often had taken notes and participated in class activities and discussions.

10. In relation to the general courses construct, the majority of both females (87.9%) and males (83.5%) agreed that the community college courses were intellectually challenging, extensive, and had prepared them for ISU courses.
11. Regarding the transfer process construct, the majority of both females (78.8%) and males (81.6%) researched ISU and visited the ISU campus prior to transferring.

### *University Experiences*

Table 15 reports the transfer students' university experiences by gender. In terms of place of residence, over half of both the females (77.0%) and males (71.0%) lived on campus. The majority of the females (38.8%) and males (33.5%) maintained a 2.00–2.99 GPA at ISU as of Fall 2009.

Over half of the students (66.0% of females and 57.0% of males) decided to attend ISU to obtain a bachelor's degree. One fifth of female students (20.5%) and a little over one tenth (13.5%) of male students attended ISU to pursue graduate or professional school.

A little less than half of the females (49.4%) and males (49.0%) found community college faculty, friends, and ISU advisors as somewhat important as influential reasons for attending ISU. One fourth of females (25.9%) and males (25.8%) found community college faculty, friends, and ISU advisors as not important as influential reasons for attending ISU. Less than 10% of females (5.9%) and males (4.5%) found community college faculty, friends, and ISU advisors very important as influential reasons for attending ISU.

Regarding the financial reasons for attending ISU construct, a little over three fourths of females (80.0%) and a little less than two thirds of males (65.3%) found financial issues as important or very important reasons for attending ISU. Twenty percent of females and about

Table 15.

*Transfer Students' University Experiences by Gender (N= 320)*

Variable	Female (n = 99)		Male (n = 221)		Difference <sup>a</sup> %
	n	%	n	%	
Current place of residence					
On campus	76	77.0	156	71.0	6.0
Off campus	22	23.0	61	29.0	-6.0
University GPA (as of Fall 2009)					
0.00–1.99	5	6.3	29	15.9	-9.6
2.00–2.99	31	38.8	61	33.5	5.3
3.00–3.49	21	26.3	46	25.3	1.0
3.5 or higher	23	28.8	46	25.3	3.5
Most important reason for attending ISU					
To obtain a bachelor's degree	58	66.0	114	57.0	9.0
To gain skills necessary to enter a new job or occupation	10	11.4	54	27.0	-15.6
To pursue graduate or professional school	18	20.5	27	13.5	7.0
To satisfy a personal interest (cultural, social)	2	2.3	5	2.5	-0.2
Influential reasons for attending ISU					
Community college faculty, friends, ISU advisors					
Not important	22	25.9	51	25.8	0.1
Somewhat important	42	49.4	97	49.0	0.4
Important	16	18.8	41	20.7	-1.9
Very important	5	5.9	9	4.5	1.4
Financial					
Not important	2	2.4	21	10.7	-8.3
Somewhat important	15	17.6	47	24.0	-6.4
Important	31	36.5	75	38.3	-1.8
Very important	37	43.5	53	27.0	16.5
Reputation					
Not important	3	3.4	7	3.5	-0.1
Somewhat important	17	19.5	40	20.1	-0.6
Important	43	49.4	88	44.2	5.2
Very important	24	27.6	64	32.2	-4.6
ISU-sponsored transfer student orientation					
Yes	52	59.1	125	62.5	-3.4
No	36	40.9	75	37.5	3.4

Table 15. (continued)

Variable	Female ( <i>n</i> = 99)		Male ( <i>n</i> = 221)		Difference <sup>a</sup>
	<i>n</i>	%	<i>n</i>	%	
How helpful was the transfer student orientation					
Very unhelpful	6	11.1	16	12.3	-1.2
Somewhat unhelpful	10	18.5	27	20.8	-2.3
Somewhat helpful	29	53.7	64	49.2	4.5
Very helpful	9	16.6	23	17.7	-1.1
Course learning					
Disagree strongly	0	0	1	0.5	-0.5
Disagree somewhat	5	6.3	15	7.9	-1.6
Agree somewhat	34	42.5	82	42.9	-0.4
Agree strongly	41	51.2	93	48.7	2.5
Experience with faculty at ISU					
Never	3	3.8	6	3.1	0.7
Occasionally	30	37.5	92	47.9	-10.4
Often	32	40.0	61	31.8	8.2
Very often	15	18.8	33	17.2	1.6
General perceptions: faculty					
Disagree strongly	3	3.0	4	1.8	1.2
Disagree somewhat	5	5.1	34	15.4	-10.3
Agree somewhat	42	42.4	102	46.2	-3.8
Agree strongly	31	31.3	53	24.0	7.3
General perceptions: negative perception of transfer students					
Disagree strongly	2	2.5	1	0.5	2.0
Disagree somewhat	24	30.0	54	28.4	1.6
Agree somewhat	42	52.5	104	54.7	-2.2
Agree strongly	12	15.0	31	16.3	-1.3
Overall satisfaction					
Disagree strongly	3	3.0	4	1.8	1.2
Disagree somewhat	5	5.0	34	15.4	-10.4
Agree somewhat	42	42.4	102	46.2	-3.8
Agree strongly	31	31.3	53	24.0	7.3

<sup>a</sup>Difference was calculated by subtracting males from females. A positive percentage indicates a higher percentage for females.

34.7% of males found financial reasons as somewhat important or not important reasons for attending ISU.

Over three fourths of both females (77.0%) and males (76.4%) found the reputation of ISU construct as being important or very important reasons for attending ISU. A little less than one quarter of females (22.9%) and males (23.6%) found the reputation of ISU as being not important or somewhat important reasons for attending ISU.

In terms of the ISU-sponsored transfer student orientation, more than half of both females (59.1%) and males (62.5%) participated in the ISU-sponsored transfer student orientation. The majority of both females (70.3%) and males (66.9%) found the transfer student orientation to be somewhat helpful or very helpful.

In relation to the course learning construct, almost all of both females (93.7%) and males (91.6%) agreed somewhat or agreed strongly that they took notes and participated in class discussions and activities. A low percentage of females (6.3%) and males (8.4%) disagreed strongly or disagreed somewhat that they took notes and participated in class discussions and activities.

Regarding the experience with faculty at ISU construct, over half of the females (58.8%) often or very often visited faculty or felt comfortable interacting with faculty, whereas over half of the males (51.0%) never or occasionally visited faculty or felt comfortable interacting with faculty. Less than one half of females (41.3%) never or occasionally visited faculty or felt comfortable interacting with faculty, whereas 49.9% of males visited faculty or felt comfortable interacting with faculty.

In terms of the general perceptions of faculty construct, a little under three fourths of both females (73.7%) and males (70.2%) agreed somewhat or agreed strongly to faculty

being easy to approach and responsive. About 10% of female students and 22% of male students disagreed strongly or disagreed somewhat to faculty and student services as being easy to approach and responsive.

Regarding the perception of transfer students, over two thirds of females (67.5%) and males (71.0%) agreed somewhat or agreed strongly that the abilities of transfer students were underestimated and that there was a stigma and negative perceptions of transfer students.

In regards to ISU overall satisfaction, just under three fourths of both the females (73.7%) and males (70.2%) agreed somewhat or agreed strongly that the courses at ISU are interesting and the campus is intellectually stimulating.

#### *Summary of University Experiences*

1. The majority of the females (77.0%) and males (71.0%) resided on campus.
2. The majority of the females (38.8%) and males (33.5%) maintained a 2.00–2.99 GPA at ISU as of Fall 2009.
3. The most important reason for attending ISU for both females (66.0%) and males (57.0%) was to obtain a bachelor's degree.
4. For females, financial reasons (80.0%) were the most influential for attending ISU, followed by reputation (77.0%), and influences from community college faculty, friends, and ISU advisors (24.0%).
5. For males, the reputation of ISU (76.4%) was the most influential for attending ISU, followed by financial reasons (65.3%) and influences from community college, friends, and ISU advisors (25.0%).
6. The majority of both females (59.1%) and males (62.5%) attended an ISU-sponsored transfer student orientation.

7. The majority of both females (70.3%) and males (66.9%) found the transfer student orientation to be somewhat helpful and very helpful.
8. Regarding course learning, the majority of both females (93.7%) and males (91.6%) agreed that they took notes and participated in class discussions and activities.
9. Regarding experience with faculty at ISU both females (77.5%) and males (79.7%) reported that they occasionally or often interacted with faculty and felt comfortable approaching faculty.
10. In terms of the general perception of faculty at ISU, the majority of both females (73.7%) and males (70.2%) agreed somewhat or agreed strongly that faculty were approachable and accessible to students and that student services were responsive to students' needs.
11. In relation to the negative perception of transfer students, a large majority of both females (82.5%) and males (83.1%) either disagreed somewhat or agreed somewhat that their abilities are underestimated and a stigma exists by being a transfer student.
12. Regarding the overall perception of ISU, the majority of both females (73.7%) and males (70.2%) agreed somewhat to agreed strongly that the courses were interesting and worthwhile and the campus is an intellectually stimulating and exciting place to be.

### Statistical Analysis of Community College Academic Preparation and Community College and University Experiences by Gender

To respond to research question 4, inferential statistics were conducted. Independent samples  $t$  tests were conducted to compare the mean scores of two groups (gender) on community college experience variables and university experience variables. The grouping variable, gender, was 0 = females and 1 = males. Tables 16 and 17 summarize the means of the independent samples  $t$  test of community college and university experiences, respectively, by gender. Appendix D shows the details of the  $t$  tests.

#### *Community College Experiences*

As shown in Table 16, the mean community college GPA of females (3.31) and males (3.16) has a difference of 0.15, which was statistically significant between gender groups ( $t = 2.56$ ,  $df = 318$ ,  $p = .01$ ) at the  $p = .05$  level. The scale was continuous.

The mean number of community college transfer semester hours of females and males was 63.46 and 57.99, respectively, with a difference of 5.47. The means were statistically significant between gender groups ( $t = 2.10$ ,  $df = 318$ ,  $p = .036$ ) at the  $p = .05$  level. The scale was continuous.

The mean of the responses of both females and males regarding community college academic advising were the same (3.03), which was not statistically significant between gender groups ( $t = .074$ ,  $df = 286$ ,  $p = .941$ ) at the  $p = .05$  level. The females and males both reported they agreed somewhat that they had consulted and interacted with academic advisors and counseling services during the transfer process, with females reporting a slightly higher mean. The scale for this section was a 4-point Likert-type scale ranging from 1 = *disagree strongly* to 4 = *agree strongly*.



Table 16.

*Means, Standard Deviations, and T test Results for Community College Experiences*

Community college experiences	Female		Male		<i>t</i>	<i>df</i>	<i>p</i>	Confidence interval	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				Lower	Upper
Transfer semester credit hours	63.46	27.00	57.99	18.49	2.10	318	.03*	.04	10.58
Transfer GPA	3.31	0.48	3.16	0.51	2.56	318	.01*	.04	.28
Academic advising	3.03	0.93	3.03	0.90	0.07	286	.94	-.22	.24
Experience with faculty	3.08	0.75	2.95	0.80	1.35	284	.18	-.063	.34
Course learning	3.50	0.54	3.30	0.64	2.45	280	.01*	.039	.36
General courses	3.20	0.67	3.15	0.69	0.56	290	.58	-.122	.22
Transfer process	3.23	0.70	3.19	0.68	0.56	293	.58	-.12	-.13
Hours spent studying and preparing for class	1.87	0.92	1.86	1.12	0.04	294	.97	-.26	.27

\* $p < .05$ .

The mean of the responses regarding community college experience with faculty was 3.08 for the females and 2.95 for the males with a difference of 0.13. The difference was not statistically significant between gender groups ( $t = 1.348$ ,  $df = 284$ ,  $p = .179$ ) at the  $p = .05$  level. The females reported often visiting faculty and seeking their advice in certain areas both inside and outside of the classroom. However, their male counterparts reported occasionally visiting faculty and seeking their advice in certain areas both inside and outside of the classroom. The scale for this section was a 4-point Likert-type scale ranging from 1 = *never* to 4 = *very often*.

The mean of the responses regarding community college course learning was 3.50 for females and 3.30 for males, with a difference of 0.20, which was statistically significant between gender groups ( $t = 2.449$ ,  $df = 280$ ,  $p = .015$ ) at the  $p = .05$  level. The females and males both reported often participating in class activities and discussions and taking notes. The scale for this section was a 4-point Likert-type scale ranging from 1 = *never* to 4 = *very often*.

The mean of the responses regarding community college general courses was 3.20 for females and 3.15 for males, resulting in a difference of 0.05, which was not statistically significant between gender groups ( $t = .561$ ,  $df = 290$ ,  $p = .575$ ) at the  $p = .05$  level. Both female and male students reported to agree somewhat that the courses at the community college were intense, developed their critical and analytical thinking, and prepared them for the academic standards at ISU. The scale for this section was a 4-point Likert-type scale ranging from 1 = *disagree strongly* to 4 = *agree strongly*.

The mean of the responses regarding the community college transfer process was 3.23 for females and 3.19 for males, with a difference of 0.04, which was not statistically

significant between gender groups ( $t = .555$ ,  $df = 293$ ,  $p = .580$ ) at the  $p = .05$  level. The scale for this section was a 4-point Likert-type scale ranging from 1 = *disagree strongly* to 4 = *agree strongly*.

The mean of the responses regarding community college hours spent studying and preparing for class was 1.87 for females and 1.86 for males, with a difference of 0.01, which was not statistically significant between gender groups ( $t = .035$ ,  $df = 294$ ,  $p = .972$ ) at the  $p = .05$  level. Both females and males reported studying about 1 to 5 hours a week studying and preparing for class. The scale for this section was a 5-point scale ranging from 1 = *1 to 5 hours*, 2 = *6 to 10 hours*, 3 = *11 to 15 hours*, 4 = *16 to 20 hours*, and 5 = *more than 20 hours*.

#### *University Experiences*

As shown in Table 17, the mean ISU GPA for the respondents, as of Fall 2009, was 3.02 for females and 2.83 for males, with a difference of 0.19, which was not statistically significant between gender groups ( $t = 1.78$ ,  $df = 181.63$ ,  $p = .08$ ) at the  $p = .05$  level. Because the  $p$  value for the Levene's test was  $\leq .05$  (.020), the null hypothesis that the variances of the two groups are equal was rejected, implying that the variances were unequal. The scale for this section was a 4-point Likert-type scale ranging from 1 = *not important* to 4 = *very important*.

The means of the responses regarding university experience with faculty was 2.74 for females and 2.63 for males, with a difference of 0.11, which was not statistically significant between gender groups ( $t = 1.00$ ,  $df = 270$ ,  $p = .31$ ) at the  $p = .05$  level. Both the females and males reported "occasionally" visiting faculty and seeking their advice in certain areas both inside and outside of the classroom. The scale for this section was a 4-point Likert-type scale ranging from 1 = *never* to 4 = *very often*.

The means of the responses regarding university course learning was 3.45 for females and 3.40 for males, with a difference of 0.05, which was not statistically significant between gender groups ( $t = .61$ ,  $df = 269$ ,  $p = .54$ ) at the  $p = .05$  level. Both groups reported “often” participating in class activities and discussions and taking notes. The scale for this section was a 4-point Likert-type scale ranging from 1 = *never* to 4 = *very often*.

The means of the responses regarding university general perception of transfer student (negative) was 2.80 for females and 2.87 for males, with a difference of -0.07, which was not statistically significant between gender groups ( $t = -.75$ ,  $df = 268$ ,  $p = .45$ ) at the  $p = .05$  level. Females and males both reported disagreeing somewhat leaning more toward agreeing somewhat end of the scale regarding their perceptions of their abilities being underestimated by students and faculty and regarding a stigma existing toward being a transfer student. The scale for this section was a 4-point Likert-type scale ranging from 1 = *disagree strongly* to 4 = *agree strongly*.

The means of the responses regarding ISU’s reputation as being influential in their reasons for attending ISU was 3.01 for females and 3.05 for males, with a difference of -0.04, which was not statistically significant between gender groups ( $t = -.37$ ,  $df = 284$ ,  $p = .70$ ) at the  $p = .05$  level. Both females and males reported reputation as being an important factor in their reasons for attending ISU. The scale for this section was a 4-point Likert-type scale ranging from 1 = *not important* to 4 = *very important*.

The means of the responses regarding financial reasons as being influential in attending ISU was 3.21 for females and 2.82 for males, with a difference of 0.39, which was statistically significant between gender groups ( $t = 3.33$ ,  $df = 279$ ,  $p = .00$ ) at the  $p = .05$  level. The females reported financial reasons as an important factor when deciding to attend

Table 17.

*Means, Standard Deviations, and T Test Results for University Experiences*

University experiences	Female		Male		<i>t</i>	<i>df</i>	<i>p</i>	Confidence interval	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				Lower	Upper
ISU GPA (as of fall 2009)	3.02	0.74	2.83	0.90	1.78	181.63	.077	-.02	.40
Experience with faculty	2.74	0.81	2.63	0.80	1.00	270	.32	-.10	.32
General perception of course learning	3.45	0.61	3.40	0.66	.61	269	.54	-.12	.22
General perception of transfer student (negative)	2.80	0.72	2.87	0.67	-.75	268	.46	-.25	.11
Influential reasons for attending:									
Reputation	3.01	0.79	3.05	0.81	-.37	284	.71	-.24	.17
Financial	3.21	0.82	2.82	0.95	3.33	279	.00*	.16	.63
Community college advisor, friend, and ISU advisor	2.05	0.83	2.04	0.81	.06	281	.95	-.20	.21
Overall satisfaction	3.52	0.67	3.59	0.56	-.87	130.25	.39	-.24	.09
General perception of faculty	3.25	0.73	3.05	0.73	1.96	272	.05*	-.00	.38

\* $p < .05$ .

ISU and the males reported financial reasons as somewhat important in their decision to attend ISU. The scale for this section was a 4-point Likert-type scale ranging from 1= *not important* to 4 = *very important*.

The means of the responses regarding community college advisor, friend, and ISU advisor as being influential in their reasons for attending ISU was 2.05 for females and 2.04 for males, with a difference of 0.01, which was not statistically significant between gender groups ( $t = .06$ ,  $df = 281$ ,  $p = .95$ ) at the  $p = .05$  level. Both the females and males reported advisors, friends, and ISU advisor as being a somewhat important factor in their reasons for attending ISU. The scale for this section was a 4-point Likert-type scale ranging from 1 = *not important* to 4 = *very important*.

The means of the responses regarding overall satisfaction at ISU was 3.52 for females and 3.59 for males, with a difference of -0.13, which was not statistically significant between gender groups ( $t = -.87$ ,  $df = 130.25$ ,  $p = .38$ ) at the  $p = .05$  level. Because the  $p$  value for the Levene's test was  $\leq .05$  (.020), the null hypothesis that the variances of the two groups are equal was rejected, implying that the variances were unequal. Both female and males reported they agreed somewhat to ISU courses being interesting and worthwhile and advisors, friends, and ISU advisor as being a somewhat important factor in their reasons for attending ISU. The scale for this section was a 4-point Likert-type scale ranging from 1 = *not important* to 4 = *very important*.

The mean of the responses regarding general perception of faculty was 3.25 for females and 3.05 for males, with a difference of 0.20, which was statistically significant between gender groups ( $t = 1.96$ ,  $df = 272$ ,  $p = .51$ ) at the  $p = .05$  level. Both males and females reported to agree somewhat that ISU faculty were interested in the academic

development of undergraduates and student services were responsive to the needs of the students. The scale for this section was a 4-point Likert-type scale ranging from 1 = *not important* to 4 = *very important*.

### *Hierarchical Multiple Regression Analysis*

Two hierarchical multiple regression models were conducted on the dependent variables social adjustment and psychological adjustment. Table 18 shows the predictors on the dependent variable of academic adjustment. A multiple regression model was used to test the predictive validity of multiple independent variables contained within the proposed model (Figure 5) on the dependent variable of academic adjustment. The independent variables were grouped into three blocks, which were introduced separately into the multiple regression model (see Figure 5).

#### *Academic Adjustment*

The academic adjustment dependent variable is characterized by students' overall academic adjustment experiences at ISU. This construct comprises four items: "The large class sizes intimidated me," "I experienced a dip in grades (GPA) during my first semester," "I often feel (felt) overwhelmed with the size of the student body," and "My level of stress increased when I started at ISU. Table 18 indicates the variables entering the regression equation for all students on the dependent variable, as well as corresponding standardized regression coefficients (betas), for each variable. Refer to Appendix E for the model summary and Appendix F for the correlation matrix of the academic adjustment dependent variable. Multiple regression analysis was conducted with the dichotomous dependent variable of social adjustment (1 = *disagree strongly to disagree somewhat*, 2 = *agree somewhat to agree strongly*). The independent variables were grouped into blocks according

Table 18.

*Predictors of Community College Transfer Student Academic Adjustment to ISU*

Variable blocks	Standardized regression coefficients		
	Model 1	Model 2	Model 3
Background variables (block 1)			
Father's highest level of education	.052	.102	.086
Gender	-.157*	-.175*	-.183*
Highest degree intended to obtain	-.118	-.086	-.075
Community college experiences (block 2)			
Community college GPA		.130	.079
Transfer semester hours		-.188*	-.164*
Associate's degree obtained		.084	.096
Hours spent studying/preparing for class		.119	.093
Academic advising		.040	.076
Experience with faculty		.365**	.228*
Course learning		-.160	-.080
General courses		-.096	-.060
Transfer process		-.176*	-.149*
University experiences (block 3)			
Influential reasons for attending—financial			-.109
General perception of faculty			-.109*
Negative general perception of transfer students			.336**
ISU GPA (As of F09)			.061
<i>R</i>	.190 <sup>a</sup>	.442 <sup>b</sup>	.595 <sup>c</sup>
<i>R</i> <sup>2</sup>	.036	.196	.354
$\Delta R^2$	.021	.144	.297

\*<sup>a</sup>Model 1. <sup>b</sup>Model 2. <sup>c</sup> Model 3.

\*\* $p \leq .05$  level. \*\*\* $p \leq .01$ .



to how they were placed into the academic adjustment model, presented in Chapter 3: background (block 1), community college experiences (block 2), and university experiences (block 3). The multiple regression model was conducted for the overall sample ( $N = 320$ ).

*Background characteristics (Model 1).* Results of the multiple regression analysis for the total sample indicated that for block 1 (background characteristics) gender is a statistically significant predictor of academic adjustment at  $p < .05$  (Table 18). The negative beta for gender indicates that males are less likely to experience a negative academic adjustment. The background characteristic variables account for 3.6% of the variance of the model.

*Community college environment (Model 2).* Model 2 included both the background characteristics (block 1) and community college (block 2) independent variables. Gender remained significant in model 2 at  $p < .05$ . Of the community college independent variables added to the equation, transfer semester hours was significant ( $p < .05$ ), experience with faculty was significant ( $p < .01$ ) and transfer process was significant ( $p < .05$ ). The background and community college variables accounted for 19.6% of variance of the model.

*University environment (Model 3).* Model 3 (full model) included variables from blocks 1 and 2 and added the remaining three university variables in block 3. The background variable gender remained significance at  $p < .05$  in the final model. The number of community college transfer semester hours also became significant at  $p < .05$ . The community college experience with faculty and transfer process remained statistically significant at  $p < .05$ . In addition to the above background and community college variables, two university independent variables were added to the equation. General perception of

faculty and negative general perception of transfer students were statistically significant ( $p < .05$ ,  $p < .01$ , respectively). General perception of faculty is a negative predictor of academic adjustment indicating that the higher the general perception of faculty the less likely students are to have a negative academic adjustment. Six predictors in the final model explained 35.4% of the variability in academic adjustment. The  $R^2$  for the initial model and the change in  $R^2$  (denoted as  $\Delta R^2$ ) for each subsequent step of the model are reported (Table 18).

### *Social Adjustment*

The social adjustment dependent variable is characterized by students' overall social adjustment experiences at ISU. This construct comprises four items: "Adjusting to ISU social environment easy," "I am very involved with social activities at ISU," "I am meeting people and making friends," and "It is easy to make new friends at ISU." Students who scored high on this dimension experienced a good social adjustment to ISU. Table 19 indicates the variables entering the regression equation for all students on the dependent variable as well as the corresponding standardized regression coefficients (betas) for each variable. Refer to Appendix D for the model summary and Appendix F for the correlation matrix of the social adjustment dependent variable. Multiple regression analysis was conducted with the dichotomous dependent variable of social adjustment (1 = *disagree strongly to disagree somewhat*, 2 = *agree somewhat to agree strongly*). The independent variables were grouped into blocks according to how they were placed into the social adjustment model, presented in Chapter 3: background (block 1), community college experiences (block 2), and university experiences (block 3). The multiple regression model was conducted for the overall sample ( $N = 320$ ).

Table 19.

*Predictors of Community College Transfer Student Social Adjustment to ISU*

Variable blocks	Standardized regression coefficients		
	Model 1	Model 2	Model 3
Background variables (block 1)			
Father's highest educational level	.016	.029	.029
Parents' household income level	-.147*	-.145*	-.139*
Gender	.019	.053	.083
Highest academic degree intended to obtain at any college	.033	.071	.064
Community college experiences (block 2)			
Hours spent studying and preparing for classes		-.027	-.032
Academic advising		.137*	.163**
Course learning		-.113	-.157*
Transfer process		.319**	.257**
University experiences (block 3)			
Influential reasons for attending—financial			.214**
General perception of course learning			.143
General perception of faculty			-.027
Experience with faculty			-.092
Overall satisfaction with ISU			-.044
General negative perception of transfer students			-.171*
<i>R</i>	.150 <sup>a</sup>	.388 <sup>b</sup>	.481 <sup>c</sup>
<i>R</i> <sup>2</sup>	.023	.151	.231
$\Delta R^2$	.003	.115	.173

\*<sup>a</sup>Model 1. <sup>b</sup>Model 2. <sup>c</sup>Model 3.

\*\* $p \leq .05$  level. \*\*\* $p \leq .01$ .

*Background characteristics (Model 1).* Results of the multiple regression analysis for the total sample indicated that, for block 1 (background characteristics), the variable parents' household income level is a statistically significant predictor of social adjustment at  $p < .05$  (Table 19). In other words, the higher the parents' household income level, the less likely students are to have a positive social adjustment to ISU. The background variables explain 2.3% of the variance of the social adjustment model.

*Community college environment (Model 2).* Model 2 included both the block 1 and block 2 independent variables. Among the background variables, parental household income level remained a statistically significant predictor at  $p < .05$ . Of the community college independent variables added to the equation, academic advising, course learning, and the transfer process were also statistically significant variables at  $p < .01$ ,  $p < .05$ ,  $p < .01$ , respectively. The background and community college variables explain 15.1% of the variance of the model.

*University environment (Model 3).* Model 3 (full model) included variables from blocks 1 and 2 and added the remaining six university independent variables in block 3. In the final model, the background variable parental household income level remained a statistically significant predictor at  $p < .05$ . Among the community college variables, academic advising became a more statistically significant predictor at  $p < .01$ . Course learning also became a statistically significant predictor at  $p < .05$ , and the transfer process variable remained a predictor at  $p < .01$ . Of the university independent variables added to the equation, financial reasons for attending and general negative perception of transfer students were statistically significant at  $p < .01$  and  $p < .05$ , respectively. This indicates that the more students are satisfied with the cost of attending and are provided financial assistance, the

more likely they are to have a positive social adjustment to ISU. Additionally, general negative perception of transfer students was statistically significant at  $p < .05$ . The negative beta for general negative perception of transfer students indicates that, the higher the negative general perceptions of transfer students, the less likely students are to have a positive social adjustment. The final model, including the background, community college, and university variables, explains 23.1% of the variance in the model.

### *Summary*

The following results were observed from the full model analysis.

#### *Academic adjustment.*

1. Among the background variables for academic adjustment, gender is a statistically significant predictor of academic adjustment.
2. Among the community college variables for academic adjustment, transfer semester hours, experience with faculty, and transfer process are statistically significant predictors of academic adjustment.
3. Among the university variables for academic adjustment, general negative perception of transfer students is a statistically significant predictor of academic adjustment.

#### *Social adjustment.*

4. Among the background variables for social adjustment, parental household income level is a statistically significant predictor of social adjustment.
5. Among the community college variables for social adjustment, academic advising, course learning, and the transfer process are statistically significant predictors of social adjustment.

6. Among the university variables for social adjustment, influential reasons for attending ISU—financial and ISU general negative perception of transfer students are statistically significant predictors of social adjustment.

#### Findings from Open-Ended Questions

The ISU–TSS had three open-ended questions that asked the students to provide more information about their overall experiences as community college transfers. More specifically, students were asked to: (a) discuss factors that assisted them in adjusting to ISU, (b) discuss things the community college could have done to assist in their transition, and (c) provide advice they would give to other community college students transferring to ISU. For each question, themes emerged regarding student experiences.

#### *What Factors Helped You Adjust to ISU?*

#### *Please Explain What Factors Contributed to Your Successful Transfer*

Three themes emerged regarding factors that assisted the transfer students in their adjustment to ISU: (a) transfer student orientation, (b) assistance from advisors, and (c) getting involved on campus.

#### *Transfer Student Orientation*

The majority of the students highlighted the benefit of the student transfer orientation in their adjustment to ISU. The students also reported how the transfer orientation provided avenues for meeting other transfer students:

“The orientation program for transfer students was really helpful.”

“I think my orientation classes with sections specifically for transfer students were very helpful. I liked that I met other transfer students who were a little closer to my age and in my major. I’ve had several of these students in subsequent classes.”

### *Advisors*

In addition to the transfer student orientation, the students valued the interaction with their advisor and found the interaction to be an essential component of the transfer process. The students reported how their advisors were able to assist them with class selections, answer any questions they had, and helped them to feel comfortable with the transfer process. The students also drew attention to how the assistance from their advisors was the very reason they decided to enroll in ISU.

“My advisor was helpful in figuring out classes.”

“Help from an advisor and other faculty made it pretty easy to make the transition.”

“Meeting with my advisor before attending ISU helped me feel comfortable about the transition and have an understanding of what to expect when I came.”

“When I asked some questions about transfer to ISU’s advisor she answered my questions kindly, and she could make the time to talk with me. Her help became one of the factors which I decided to go to ISU.”

“I met with a transfer advisor frequently before I transferred, I feel like that really helped me to knock out my core classes so all I had to take when I got to Iowa State were my major classes and gave me a better chance to focus on my major courses.”

“My advisor made my transfer easy, pain-free, and quick. Honestly, if it weren’t for her, I might not have enrolled when I did.”

### *Getting Involved*

The community college transfer students believed in getting involved in campus organizations, clubs, and different welcome events. Some of the clubs and organizations in which the students were involved were the Farm Op Club, Student Veterans of America Club, Destination Iowa State team leader, sororities, and clubs and organizations within the individuals’ majors. The students viewed this affiliation as a way to feel connected to the

college environment. Being involved on campus was viewed as a great way to assist in the adjustment to ISU.

“Welcome events where everyone was new.”

“Joining the Farm Op Club really helped me at the beginning of the semester.”

“Getting involved definitely helped me become adjusted to ISU. The different clubs helped me meet new people.”

“I joined the newly formed Student Veterans of America Club and became an officer as soon as the club started.”

“I became a Destination Iowa State team leader to gain more leadership experience and gain more familiarity with the campus.”

“I got involved with coaching a soccer team with a professor I had. Joining clubs of my interest.”

“Joining major related professional/student associations.”

“I joined a sorority which has helped immensely when it comes to making friends and meeting new people. Also, my on-campus job helped to further me in my major and to make friends.”

“I joined a social fraternity to meet new people and establish study habits.”

In addition to the different clubs and organizations, one student expressed the need for a push for students to get involved on campus. The students highlighted how, although involvement is an important factor in the transfer process, it can be difficult to take the necessary steps to get involved when you do not feel accepted or feel connected to the environment.

“It would have been great if there was more push for involvement around campus. It’s hard to take the step to get involved in a group and even harder when you don’t feel like you’re accepted.”



*What Might the Community College Have Done to Enhance  
Your Success or Ease the Transition to ISU?*

The transfer students expressed their thoughts regarding things the community college could have done to assist with transition in several ways. There were four themes that emerged regarding the students' thoughts: (a) nothing; everything was good, (b) being more university-like: accountability and rigor of courses, (c) transferability of courses, and (d) communication and collaboration between the community colleges and ISU.

*Nothing; Everything Was Good*

Many of the transfer students were satisfied with the assistance they received from the community college and felt that the community college prepared them for their academic journey at ISU. The students were pleased with the level of advising provided by the advisors and they were also satisfied with the instruction and curriculum at the community college.

"I feel that community colleges are excellent places for learning. They might not have every specific major that people intend; however, they can prepare students for the work force and also prepare them for a four-year college such as ISU."

"I think the community college offered excellent instruction and curriculum."

"They did the best they could. I can't think of anything more they could have done."

"I think that [community college] does a really good job of advising."

"Community college gave me a strong foundation for learning and the confidence to excel at ISU."

*Being More "University-Like"*

The majority of the students drew attention to the need for the community colleges to be more "university-like." When expressing these thoughts, the students highlighted concerns regarding accountability at the community college and rigor of courses at the community college.

*Accountability.*

“Treat students more like they do at the university. They’re kind of pushovers when it comes to late assignments and make up exams. I’ve had professors give you unlimited time to take exams, which is never offered at universities.”

“Be more challenging.”

“Make the classes more like college and not let us slide as easily. It is definitely not the same at ISU.”

“Maintain stricter standards. The instructors are much more willing to give students favors because they personally know each one. I don’t think this is a good educational technique, so I’m not exactly advocating it, but not spending time explaining.”

“Higher academic standards for their students. Covering more material in the biology 211 and 212 courses.”

*Rigor of courses.*

“More stringent standards for evaluation of knowledge of the subject matter.”

“The courses **MUST** be more challenging.”

“Offer classes that are somewhat rigorous, and know whether they will really transfer as anything but electives.”

“Perhaps some teachers at community college would have helped me adjust better by challenging me more. Many of the classes at community college were not very difficult.”

“At the community college which I attended, there were not many classes that were considered “problem solving.” I wish there were more pre-engineering courses offered, or at least courses which made you solve problems.”

“Hold higher academic standards and provide more challenging engineering projects. I felt that the academic standards at my community college were very similar to that of public high school.”

“Community college was nowhere near challenging enough to prepare for the academic rigor of the ISU College of Engineering. I had no real study skills since I did not need to take notes or study for exams to pass.”

“Conduct classes more like an ISU instead of a high school class.”

“Be more rigorous. It is true that classes at the community college are easier than at ISU and require far less studying outside of the class, so a transfer student might be unprepared for the workload at ISU.”

### *Transferability of Courses*

In addition to the students’ thoughts regarding the experiences at the community college, the students highlighted the need for transferability among courses from the community college to ISU.

“Improve courses so that they can transfer to ISU instead of finding you wasted all the time and the classes not meaning anything to your degree at ISU.”

“Provide students with better help in choosing classes so you are ready for your transfer to a four-year college.”

“Help with advising classes that will transfer and suggest classes that will help.”

“They could have told me what classes transferred and what didn’t.”

“The availability of what classes transfer.”

“Had more courses offered that had the ability to transfer. I had to pick up classes my last year at the community college to transfer here with enough credits.”

“I wish I would’ve known that some of the classes I took at DMACC wouldn’t have transferred here before I took them. The people I talked to at DMACC didn’t seem to know much. Also, the classes could’ve been a little faster paced or harder.”

“They would have really helped my success if they would have been absolutely, one hundred percent sure on what classes I should take that would apply to my degree, so I wouldn’t be stuck with 12 credits that don’t apply to my degree.”

### *Collaboration and Communication Between Community Colleges and ISU*

The students felt that more collaboration and communication among community colleges and universities would allow for a smoother transition. The collaboration among the two institutions would help students set an academic plan that would be relevant to both the community college environment as well as ISU.

“More communication with advisors within my major.”

“Help plan courses that actually transfer into majors at ISU. Not all of my credits taken at DMACC transferred to ISU. The advisors should be more knowledgeable about ISU majors and care more about students who are interested in transferring”

“They could have been more informed about ISU credits and what would transfer best from [community college].”

“Make sure each college is on the same page and not say this class will count when I transfer over to ISU. Now I have to retake classes that I already took!”

“Work more closely with Iowa State.”

“The advisors could have been better informed about specific items related to ISU, but I understand that they cannot possibly be extensively trained in every college.”

*If You Could Give Some Advice to Community College Students Who Will Be Transferring to ISU, What Would That Advice Be?*

The community college transfer students at ISU were asked to provide advice to future transfer students who would be attending ISU. There were four themes that emerged from the students responses: (a) be academically prepared, (b) communicate with your advisor, (c) get involved, and (d) develop good study skills.

### *Be Academically Prepared*

The transfer students highlighted the need to be academically prepared. They expressed the importance of having a clear understanding of areas of interests and taking classes that are relevant. The students also expressed taking classes with labs for hands-on experience.

“Make sure you take classes that are specific to your major and will transfer to a university. Know what you want to do and find a major before transferring.”

“Be prepared for a very competitive environment and try to find out which classes you need to take before you get here so you will graduate on time.”

“Make sure that all classes transfer over and are compatible with the school.”

“Be prepared to feel overwhelmed with classes.”

“Take the hardest classes you can at a CC.”

“Take the harder classes at a community college. Because you can get much better one on one time and be able to better understand the material.”

“Take classes with a lab in it b/c then you get a chance to interact.”

“Take all the classes you can before coming here and having to take the classes that aren’t in your major. Once you get here you’re going to want to start your major but if you’re behind you’ll feel like you’re never going to make it.”

### *Communicate with Your Advisor*

In addition to being academically prepared, the students expressed the need to communicate with one’s academic advisor. It is essential that the advisor is aware of a student’s plans to transfer as well as that individual’s area of interest. This clear understanding between the student and advisor helps both individuals to understand the preparation that is needed while at the community college.

“Talk to your advisor a lot and if they don’t work with you find a new one! And talk with your instructors—you’ll get more out of your experience.”

“Make sure your counselor understands your plan to transfer. Also ask to know what classes will transfer to ISU so you are not taking credits that will not be useful to you when you start at Iowa State.”

“Communicate. Talk with advisors both at your community college and at ISU to be sure you are taking classes that will transfer into your future major at ISU.”

“Get on your advisor. Tell them what you want to do and ask them what needs to be done.”

### *Get Involved*

The students also expressed the need to get involved and stay involved. This involvement can be through the student orientation or other campus clubs and organizations.

“Go to orientation, get involved early and stay involved.”

“Get involved!!!!!!”

“Get involved and make friends at the start of the school year so you have friends the whole time you are at ISU.”

“Get involved right away! Your two years will go very fast and you have to jump right in and make the most of the time you have at ISU!!”

“Get involved and stay on campus at least your first year to get to know new people.”

“When you get to ISU get involved in a club or something outside of class.”

### *Develop Good Study Skills*

Current transfer students also advised future transfer students to develop good study skills and time management skills, as these skills are definitely an asset at ISU.

“Try to develop good study skills.”

“Even though the classes may not be difficult, get used to going to class, paying attention, and taking notes. A lot of the professors at ISU don’t sit and take attendance (some do), so if you want to succeed and do well, you need to habituate yourself.”

“To learn good time management skills and use them when you begin your time at ISU.”

“The speed of the lectures at ISU is faster and the content of lectures is more difficult as compared to the community college. So, I recommend the students to work hard and acquire the practice of study every day.”

### *Semistructured Interview Findings*

A particular goal of this study was to learn about the socialization experiences of the female community college transfer students pursuing STEM bachelor degrees at ISU. To explore this area, semistructured, one-on-one interviews were conducted with 5 Iowa community college female transfer students pursuing STEM bachelor’s degrees at ISU. Descriptive reporting is used to reveal the profiles of the 5 transfer students who participated in this part of the study. I assigned a pseudonym to each student following the interviews.

This section is divided into three parts. First, an overall profile is provided for the group of interview participants. Second, an individual detailed profile is provided for each of the 5 interview participants. Each profile follows the sequence of the quantitative model components described in Chapter 3: background characteristics, community college experiences, and university experiences. This part highlights where the students currently were in their educational journey. The final part presents the themes that emerged from the interviews.

### *General Participant Profiles*

The 5 female interview participants were Iowa community college transfer students who were pursuing their STEM bachelor degrees ISU. It is important to note that the 5 interview participants are White female STEM majors. The findings of this section will reflect the experiences of white female students. Table 20 reports a summary of each of the interview participants. Each participant had attended an Iowa community college prior to

Table 20.

Background of Interview Participants

Pseudonym	Community college credentials <sup>a</sup>	Classification	Major
Jessica	None	Senior	Dietetics
Karen	AS	Senior	Biochemistry
Tasha	AS	Senior	Animal Science
Becky	None	Graduate	Food Science
Tina	AS	Senior	Kinesiology

<sup>a</sup>AS = Associates of Science.

attending ISU. Three of the participants had obtained an associate's degree prior to transferring to ISU; one had not obtained an associate's degree but had transferred with credit hours; and one had not obtained an associate's degree, however she had a pharmacy technician certificate. All of the interview participants aspire to obtain a degree higher than their bachelor's degree. Three of the participants aspire to obtain graduate degrees, one participant has been accepted into ISU's Veterinary School, and the other participant aspired to enroll in veterinary school in the fall. All of the interviews occurred face-to-face.

The transfer students indicated that they all grew up in Iowa. Although all of these students enrolled in ISU as STEM degree seekers, their socialization regarding their early social experiences, which Weidman (1987) referred to as precollegiate, community college, and university experiences, were different. Additionally, their motivation for aspiring to pursue a STEM major was different and unique. A description of their stories follows.

### *Individual Participant Profiles*

#### *Jessica*

"I really enjoyed working with the dietitians and working with the patients and decided that I wanted to pursue a degree in dietetics."

Jessica is a nontraditional student at ISU. She is married with two children. Jessica is currently a senior and will be graduating May 2010 with her bachelor's degree in Dietetics in the College of Human Sciences.

*Precollegiate background characteristics.* Jessica was able to gain early experience in dietetics. Her early experiences included washing dishes at a hospital and working in the dietary department at the hospital. This opportunity opened doors to additional experiences that would soon assist in forming an area of interest.



“I worked when I was 16. I got a job washing dishes in a food service department in a Hospital. And from there I transferred into the dietary department and worked as a dietary aid. I worked as an aid in there for like 7 or 8 years. I worked as an aide and then worked as a dietetic technician, they trained me and so working as a dietetic technician, I really enjoyed working with the dietitians and working with the patients and decided that I wanted to pursue a degree in Dietetics.”

Jessica’s story is quite unique in that she began her university experiences as a nontraditional student. Prior to enrolling in college, she was a stay-at-home mom. However, Jessica always anticipated going back to school.

*Community college experiences.* Prior to attending ISU, Jessica attended a College in Illinois and at a college in California. Jessica’s husband is a university professor. Jessica has attended two community colleges. During her teen years, she attended a community college and enrolled in a community college twenty years later in Iowa. She does not have an associate’s degree but she has a pharmacy technician certificate. Jessica recalled her community college experiences:

“I just remember feeling really comfortable at the community college. The classes were smaller than they are here [at ISU]. . . . It was an easier transition from high school to the community college because it was still kind of still a more personal environment. The teachers they were really for the most part really relaxed and friendly. They were really smart and they were intelligent and could teach. You know they could reach the students.”

Jessica also spoke about her academic preparation at the community college. She felt the community college prepared her for the rigor of the classes at ISU:

“The anatomy and physiology class, even though it was so long ago, working with the human cadavers was just something that you take with you forever. You know learning about a body, and seeing it and touching it and manipulating things, prepared me very well.”

Jessica valued her experiences at the community college and believes beginning her postsecondary education at a community college was a rewarding experience:

“I think that if you start out at a community college there is nothing wrong with that. . . . I think a lot of my classes were more superior to classes that I have had here and it’s a great place to start and then you figure out what you’re going to do and move to the institution because it cost a lot more and you know kind of crazy.”

*University experiences.* Jessica transferred directly from community college to ISU.

When asked to reflect on her adjustment from the community college to ISU, she expressed:

“My adjustment was probably a couple of months. I remember being scared to death the first week. Like totally scared to death, like I was taking notes and my hand was shaking and I’m like, ‘Oh my goodness.’ I was so scared and I don’t know why. I was a nontraditional student, so everyone around me was like 19. . . . So like everybody around me was like really young and that was uncomfortable, and the classrooms were huge and figuring out where my classes were and then of course tying this all into having a family.”

*Karen*

“I’ve been interested in living things and all that stuff since I was a little kid . . . I found that very fascinating that you can explain how living things work by chemical and physical laws.”

Karen, a senior majoring in Biochemistry, will be graduating Spring 2011 from ISU.

Karen is married with one son. She stays in Ames, Iowa from Monday through Friday with her son, and drives home 3 hours for the weekend. As a child, Karen enjoyed playing in the woods and building forts. She spent a lot of time trying to make things to sell at the farmers market. Karen describes her parents as “hippies” and experienced the “home schooling streak.”

*Pre-collegiate background characteristics.* Karen has had an interest in science since she was a little kid. Her mom also had an interest in science, so she had access to science-related magazines. This interest in science promoted her interest in science-related TV shows:

“My mom was interested in nature and so I had a subscription to science-related magazines. When I was a little kid I used to get up at 6 o’clock in the morning on Saturday mornings to watch ‘Bigman’s World.’”

In addition to television shows, Karen also participated in many outdoor activities:

“I was also kinda into figuring out how to live off the grid I suppose . . . trying to survive off the land and find food in the woods and stuff like that.”

*Community college experiences.* After graduating from high school, Karen began to inquire about “how life works” and how “living things work.” She enrolled at a community college. Karen became pregnant after her first semester at the community college and decided to wait 6 years before returning to school. After 6 years, Karen obtained a job and began working for an employer who would pay for a college education. She enrolled at the community college because her employer was taking care of her educational expenses.

“My employer would basically pay the community college tuition rate for my freshman and sophomore year and plus I have a son. I didn’t really have a choice at the time.”

Shortly after high school, Karen became an atheist and had interest in the chemistry of life. She explored possible areas of interest and decided to pursue biochemistry at the community college.

“I was taking Biology 211. I believe as a freshman at [an Iowa community college] we just briefly touched on the chemistry behind life and I found that very very fascinating that you can explain how living things work by chemical and physical laws.”

While at the community college, Karen valued her experiences with the faculty members:

“[The faculty] were very friendly. I liked them a lot. We all knew each other by our first name pretty much. I had kind of a mentorship with a biology professor that I was talking about before. We often spent a lot of time not just with that professor but with a lot of other ones outside of the class discussing topics within their field. . . . I still keep in touch with a few of them. . . . We were almost like friends.”

Although Karen enjoyed the interaction with the faculty members at the community college, she felt as though she stuck out like a “sore thumb”:

“I felt like I stuck out like a sore thumb because I participated basically in every class discussion and supposedly they weren’t discussions. They were supposed to be lectures. I suppose that’s how the other students thought it was supposed to be.”

*University experiences.* After receiving her associate’s degree, Karen transferred to ISU. When asked to describe her university experiences, Karen described them in terms of the academic environment:

“There seems to be a lot more participation by the students. Unless you pick on me I’m not going to be the person that raises my hand. I mean I’m being honest, so it’s kind of nice. We did have some interesting questions. The professors seem very approachable. Like they want you to understand so it’s not this way where the question you’re going to ask is going to be a dumb one.”

*Tasha*

“I told my parents when I was about two that I wanted to work with animals someday. . . . I’ve always loved animals. I think that helped to influence my decision in pursuing this career in animal science.”

Tasha is a traditional age student. She is a senior at ISU, majoring in Animal Science. She graduates May 2010. She transferred to ISU from Marshalltown Community College. After graduation, Tasha plans on attending veterinary school. As a child, Tasha lived on a farm and had animals.

*Precollegiate background characteristics.* When asked to discuss her early experiences, Tasha asserted:

“I grew up on a small farm outside of Tama, Iowa. We have horses, and dogs, and kitties. . . . I think it’s just my love for animals but I think [living on a farm] taught me to get into this stream of field that I want to work in.”

Tasha also had the opportunity to participate in a high school job shadow where she was able to further explore her interest in animals:

“In high school I did a day job shadowing with a horse vet. That pretty much sealed the deal for me. I went for a day with him and learned so much in that one day. That’s it—game over.”

*Community college experiences.* After graduating from high school, Tasha attended a community college in Iowa. Tasha had great experiences with the faculty at the community college. She appreciated the availability and flexibility of their schedules”

“I love my community college professors. They are so helpful. They’re there all the time. It’s like you can just go to their office. You don’t have to set up an appointment. You can talk to them like what’s going on in class like if you missed a day, you can get the notes from them. You don’t need to find a fellow student. They were just super there to help you. I think they were fantastic at helping me.”

*University experiences.* After receiving two associate’s degrees, Tasha transferred to ISU. When asked to describe her university experiences, Tasha asserted:

“I would say there is a lot of difference in the dynamics. Here a lot of students don’t pay attention—they are on the cell phone and computers, and they ignore the professor’s lecturing. They don’t come to class and nobody’s going to notice. Like at the community college, we had class discussions and you were expected to chime in and participate in class discussion and answer questions and ask questions. That was expected of you from the professors there. Here, some professors don’t even like to answer questions. I feel like some of the professors are here teaching because they have to and not because they want to.”

*Becky*

“I had always been interested in science, so that kind of led me to kind of lean toward Animal Science or Food Science.”

Becky is a graduate of ISU. She graduated in May 2009 from the College of Agriculture and Life Sciences. Her major was Food Science. Becky is currently working at a

Wine Industry Institute. Prior to attending ISU, Jessica attended [an Iowa community college].

*Precollegiate background characteristics.* Becky had a different experience. Both of her parents were interested in agriculture and had received their master degrees in this area. Additionally, both of Becky's parents taught agricultural education in high school. This readily available connection brought about the awareness of different agriculture-related organizations:

“Both of my parents both got their bachelor's degrees from Iowa State in Agricultural Education. They both went on to eventually earn their master's and they are both working at a university. Both of my parents taught agricultural education at the high school which got me involved in FFA.”

Becky also remembered that she received a microscope for Christmas:

“Yeah, I actually remember getting a microscope for Christmas one year, so I think I always did like science.”

During high school, Becky attended a high school that was about 30 minutes from ISU. This gave her the opportunity to gain experience in food science.

“I attended a community college that was about 30 minutes to the west, so we got to collaborate with some Food Science events. I knew that I wanted to come here and major in Animal Science or Food Science by the time I was only a sophomore in high school.”

*Community college experiences.* Becky enrolled in a community college due to cost concerns and to play volleyball. When asked to talk about her community college experiences, Becky talked about faculty members. She discussed how helpful they were and how familiar she already was with some of the faculty members:

“I think I knew a lot of faculty pretty well. I had known [a certain professor] from when she helped us in high school. I spoke with [a professor] during the transfer

process. I had met with him and right away when I came, he was an advisor in the Food Science Club, so I got to know him through that.”

Becky also discussed the community college class environment.

“I would say that because of the smaller class size it feels more like high school. You also know your professors. The climate though was really great for learning.”

Becky’s mom also worked with articulation agreements so she was very familiar with the process.

“My mom did a lot of work with articulation agreements. So she was familiar with all the staff and especially in Agriculture.”

*University experiences.* When asked to describe her university experiences, Becky drew attention to the classroom environment:

“The really large lectures were not overwhelming or shocking really but it was different because it is a lot of students. The large classes just mean that you’re interacting, and they are teaching.”

*Tina*

“I want to work with the older population and do more wellness and cardiac rehab type things.”

*Precollegiate background characteristics.* When asked to talk a little bit about her background, Tina mentioned that she was very physically active growing up. She was very involved in sports.

“I was in all sports, I did dance, I did all sorts of extracurricular activities. . . . During high school I actually taught classes and I also taught adult classes.”

*Community college experiences.* After graduating from high school, Tina decided to attend the community college for financial reasons:

“I actually got a full ride scholarship to [community college] so I took advantage of that free money to get a head start.”

Tina's experiences at the community college were very positive. She also had really good relationships with the faculty:

"They [faculty] were available whenever we need assistance for anything. . . . The lady that I regularly talked to had kids that went to my high school so I already knew her from before. . . . The professors were always really approachable. They had their office hours and they did not have TAs and different things like that. You'd go through and it was always straight to the professor so that was nice."

Tina also expressed that her classroom experiences at the community college were very engaging:

"We'd have a lot of big group discussions or we'd have lots of group projects and things so we'd get together."

Regarding academic preparation, Tina took many math and science courses prior to transferring to ISU. Tina was also involved in Phi Beta Kappa.

Tina began her academic journey as an Engineering major. She quickly decided that she did not want to major in Engineering. While at the community college, someone mentioned an exercise major to her:

"I've always danced growing up so someone mentioned to me about an exercise major, and so I looked further into that and that's when I chose to switch to Kinesiology."

*University experiences.* When asked about her relationships with the faculty at ISU, Tina asserted that:

"I think you were able to develop more personal relationships with the professors at the community college. Here it's strictly professional. You approach them for more class things as far as just having a common conversation with the professors at [an Iowa community college] better than here."



### *Making Meaning of Participants' Voices*

The qualitative portion of this study was designed to explore the female transfer community college students' responses to the following research question: "How do community college transfer students describe their overall socialization experiences in STEM majors?" When exploring this question three themes emerged from the female transfer students' stories: (a) support systems, (b) academic preparation, and (c) involvement. The findings are intertwined within the essential elements from Weidman's (1987) undergraduate socialization theory. An important aspect of this theory is that Weidman takes gender into account and recognizes that gender is a critical component of experiences and influences how experiences are interpreted.

#### *Support Systems*

The female participants identified support systems throughout their socialization process. They mentioned supportive individuals at varying stages of the process. While all of the students mentioned family as a support system, a few of the students highlighted ways that the faculty and advisors had served as support systems as well.

*Family.* When Jessica decided to enroll at ISU, she had really good support systems that encouraged her along the way. Her husband, a faculty member, was one of her supporters:

"My family was really supportive. . . . We have no family here so I just have my husband and my kids here, and then my family is in Illinois and they were really supportive. When they can't do anything to help me, they were supportive."

Karen's support systems include her father, brother, and husband. Tasha asserted that her parents were always supportive of her decisions:

“My parents always supported me in my decisions . . . both my parents. I have a brother and they support him in his academic ambitions.”

Tina highlighted how her parents are focused on ensuring that she is fulfilling her goals. She describes her parents as follows:

“They are very supportive. They want me to do what I want to do. They don’t really give their opinion. Rather, they make sure that is what I want to do and that I completely thought things through and have a good plan in mind.”

When asked to discuss her support systems, Becky recalled how her parents assisted her in identifying activities that were relevant to her interests and ultimately her major:

“I always liked science, and I liked being outdoors, and I raised livestock and showed animals at the fair, and I did 4-H and FFA. I did cooking and nutrition and things like that for 4-H. Once my parents figured out what I liked, then they helped me kind of tailor to that. They let me figure out kind of the area and then they helped push me along I think.”

*Faculty.* Jessica also identified a faculty member who was very influential in her experiences. Jessica had pursued nursing because her mom wanted her to be a nurse. Jessica, however, was not interested in nursing and did not want to pursue nursing as a career. After being in the program for a semester, she went to one of her professors in Nursing and explained to this professor that she was going to drop out of school because she was not interested in nursing. Jessica also explained that she would return to school after she figured out what she wanted to do. The professor looked at Jessica said: “You know . . . I did the same thing.” Jessica explained that those simple words made her feel empowered. To hear those few words from “such a successful nurse and successful teacher in the nursing program” helped Jessica to understand that she was not a failure because she wanted to drop out. Jessica expressed:

“Here’s this women who was very head strong . . . but she cared enough and she knew. I mean she has experienced the same things. She dropped out at some point and then went back to school. She had experienced that and was like, ‘Yeah, I did do the same thing.’”

Although all of the participants had positive support systems, Karen recalled an instance when she did not feel supported. This, in turn, affected her future participation in class. Karen felt that her outgoing spirit in class regarding participation in class and asking questions was not well received by her peers. She would pose questions that did not receive a response from her peers:

“He just basically stayed out of it and he didn’t participate in the threads. . . . I kind of toned down my participation after that.”

*Advisor.* Jessica also valued her experiences with her advisor. When asked “what was the most helpful transferring to ISU” Jessica responded:

“The most helpful? I would say my advisor. Yeah. Hands down. It’s really good to have a good advisor. She knew everything. She just sat down and told me to bring in my transcripts and she just knew everything that would pretty much transfer. If it had not been for my advisor, I would not have continued with school.”

### *Academic Preparation*

Another theme that emerged is academic preparation. The participants discussed the need to take math and science course not only at high school but also at the community college. Being academically prepared was a common phrase throughout the interviews.

Many of the participants concurred with Tina who stated:

“I think classes at the university are a lot more difficult because I think you are expected to know a little bit more. A little bit more in depth. But I mean I think everybody knows that they are the difficult classes.”

Taking as many math and science courses were important to the participants. Becky asserted:

“I would say take as many science and math classes as you can in high school, the upper level classes. Take AP level classes if you can. If you have a community college or high school level class that will let you get college credit, I would definitely do that.”

Tina agreed, stating:

“I took a lot of math and science to get those classes taken care of before coming to Iowa State University.”

Tasha highlighted that some of these classes can be taken while in high school:

“I took like 6 or 9 credits coming in or something like that. I start at [an Iowa community college] from high school. I got some credits before enrolling at the community college.”

Becky felt the math and science courses prepared her for the rigor of the courses at ISU:

“The math and science classes definitely prepared me. I felt very prepared when I came. I mean, of course organic chemistry is going to be hard no matter what, but I didn’t feel like I just didn’t get it.”

Karen had a somewhat different perception of the classes at the community college and felt that her academic preparation at the community college did not prepare her for the rigor of the courses at ISU:

“I thought before that they might have not been rigorous enough especially my biology class. His tests were way way too easy and I felt his lectures didn’t really go deep enough.”

Tasha asserted that it is important to not only take as many classes, but it is also important to take as many advanced classes as possible:

“I took a higher math at the community college that I had to have for here. I took calculus and I had to have Math 150 here or something like that.”

Tasha also stated that:

“If you take the right classes at the community college, you’ll be fine when you come here. But . . . I suppose if you take like the easy classes and they try to transfer, it’s not going to work.”

### *Involvement*

Being involved and engaged in campus activities and organizations at the community college and ISU were essential to the interview participants. All of the participants were involved in at least one campus organization. A few of the participants were not only involved in several organizations but also held offices in the organizations. Becky was an Agriculture Ambassador. Both Tina and Tasha were involved in Phi Beta Kappa, which is a community college honor society. Tasha was also involved in several other organizations on campus:

“I was involved in volleyball. I was also on the judging team. I am also in the Pre-Vet Club.”

Tina was also involved in the DubH class, which is a hip-hop club on campus. Karen was very active with the Biology Club. She also started a new club at her community college:

“I was active in the biology club . . . very active. I organized most of the events and the fundraisers. I held the positions of VP, president, treasurer. I also started a new club . . . the Free Thinkers Club.”

### *Qualitative Findings Interviews Summary*

This section presented the qualitative findings of the study through analysis of a group profile of the participants, individual profiles, and a summary of three emergent themes: support systems, academic preparation and involvement. When presented collectively, these themes provide an understanding of how female community college transfer students describe their overall socialization experiences in STEM areas. Based on data from the interviews, I was able to acquire rich, thick descriptions of how female community college transfer students describe their overall socialization experiences.

### Summary

Chapter 5 includes the findings of this study intertwined with related literature. The chapter also includes a discussion of implications that can assist 2- and 4- year institutions and policymakers regarding the socialization of community college transfer students. This chapter will also provide recommendations regarding the socialization of female community college transfers students. In addition, I will describe my personal reflections regarding my journey through this study.

## CHAPTER 5. DISCUSSION OF FINDINGS, IMPLICATIONS FOR POLICY AND PRACTICE, AND CONCLUSION

This chapter discusses the quantitative and qualitative results and overall findings of this study. This chapter is divided into seven sections. First, a summary of the study is provided. Second, the findings of the quantitative and qualitative findings are discussed. A conclusion is then presented. Lastly, this chapter will conclude with Implications for Policy and Practice, Application of the Study, Recommendations for Future Research and final thoughts.

### Summary of the Study

Chapter 1 described the importance of increasing the representation of community college transfer students, more specifically, female transfer students pursuing bachelor degrees in STEM majors. This chapter also provided an overview of the national urgency for this increase in the representation of transfer students in STEM majors.

Chapter 2 presented an overview of the literature, including studies on women in STEM, the role of community colleges, and the socialization levels of women in STEM fields. Chapter 2 also presented the two theoretical frameworks of involvement and socialization used in understanding the socialization factors and experiences of transfer students. Astin's (1984) theory of involvement within Weidman's (1987) undergraduate socialization framework provided a foundation for understanding various involvement factors. These involvement factors impact the overall socialization of transfer students, including the level of academic and social adjustment to the 4-year institution. Additionally, this chapter provided a hypothetical conceptual framework for community college transfer students (Figure 2) and explored the different layers of socialization for women in STEM.

These layers of socialization include gendered societal influences, academic preparation, as well as cultural and structural influences. Additionally, self-efficacy was examined as it relates to the subjective preparation of individual abilities and capabilities. The socialization process includes support systems, mentors (faculty and peers), and the overall academic and social integration as it relates to women in STEM. This chapter further explored the role of community colleges in socializing women in STEM majors.

Chapter 3 presented the quantitative and qualitative methodology in addition to methods used in designing and conducting this study. Specifically, the research questions, hypothesizes, research design, setting, population, sample, data collection, instrumentation, variables, data management, and method of data analysis were presented.

Chapter 4 contained the results of the quantitative and qualitative analysis. Chapter 4 provided a comprehensive reporting of the demographics of the community college transfer students. Further, statistical analyses of the community college and university experiences were reported in this chapter by gender. Additionally, the results of the sequential hierarchical regression analysis on the two dependent variables, social adjustment and academic adjustment, in addition to findings from the open-ended questions were provided. Lastly, this chapter provided the qualitative analysis and findings of the interviews conducted with five female community college transfer students in STEM majors. Their voices were expressed through individual profiles, group profiles, and a summary of emergent themes.

Chapter 5 summarizes the research and provides a discussion and conclusion. Implications for policy and practice, application of the study, recommendations for future research, and my final thoughts are presented.



### Discussion of Findings

The findings of this study, discussed below, supported the dimensions of Weidman's (1987) conceptual framework of socialization and Astin's (1984) theory of involvement. More specifically, parental socialization and academic collegiate experiences are factors that impact the academic and social adjustments of community college transfer students. In addition, the qualitative findings provide an explanation of the experiences of female students in STEM majors. The following sections focus on the research results related to the background and collegiate experiences within the context of the literature review presented in chapter 2.

The findings of this study support the socialization literature, which states that socialization begins as soon as a child is born and that this socialization continues throughout an individual's life span (Oaks, 1990). Further, the findings of this study showed that female students were introduced to STEM-related areas and activities very early within their development. For example, the qualitative findings revealed that female students were involved in science- and math-related organizations and activities in their youth. Additionally, many of the female students reported that parental influences impacted their overall experiences and perceptions toward STEM areas. One student asserted that both of her parents were agriculture teachers. Another student expressed that her mom liked science and would occasionally buy her science-related magazines. Moreover, one student was raised on a farm and had early experience with large animals. It is very evident that the female students within this study had previous associations and experiences and were not strangers to math and science areas. This socialization was also apparent in the post-secondary academic journey as well.

### *Academic Adjustment*

Contradictory literature exists regarding the academic preparation of female transfer students in STEM fields. Although some literature asserts that men are more likely to enroll in math- and science-based classes (Seymour & Hewitt, 1997), other studies revealed smaller differences in academic preparation (Hyde et al., 1990). The female students in this study not only transferred more credit hours than did their male counterparts, but they also obtained higher transfer GPAs. The findings of this study indicate that students with a larger number of transfer credit hours are more likely to have a positive academic adjustment. A plausible explanation is that those students are more academically prepared. Additionally, in the qualitative interviews, the female transfer students expressed taking an abundance of math and science courses and honors classes. Moreover, the female students reported taking college level classes at the local community college while still enrolled in high school. In addition to math and science course academic preparation it is also important to consider the experiences of students within the actual academic environment. How students engage in classroom discussions and activities and how they interact with faculty are essential components of the socialization process.

### *Collegiate Environments*

The collegiate environments of transfer students, including the community college and university environments, play a major role in the level of adjustment among transfer students. Both the community college and the university are influential components in whether students choose to continue in math- and science-based majors. The findings highlighted several overarching factors that impact and impede the academic adjustment level of transfer students.

*Community college classroom environments.* The majority of the literature highlights the classroom environments and cultures of STEM areas as being “chilly,” where conversations and discussions are male dominated (Matlin, 1993). Additionally, in a 1950 study, Seymour found that females felt unwelcomed and uninvited by faculty in the classroom. A more recent study conducted by Rypisi et al. (2009) exerted that women found it difficult to comply with cultural practices within the classroom. The findings in this study contradicted previous studies. In fact, the female students participated in class discussions, took notes in class, and engaged in classroom activities and projects more often as compared to their male counterparts. Moreover, their high level of classroom involvement negatively impacted their social adjustment. In addition to the interaction in the classroom, interaction with faculty and staff was also cited as playing a critical role in socialization.

*Community college mentee–mentor relationships.* Faculty and academic advisors play an essential role in the adjustment of community college transfer students. Although the findings of this study reported community college academic advisors as positive influences on the adjustment of transfer students, the experience with community college faculty was found to negatively impact the academic adjustment. Regarding academic advising, all of the interviewees, both traditional and nontraditional, revealed that academic advising was essential in their academic adjustment to ISU.

More specifically, the findings in this study showed that the more students interacted with faculty at the community college, the more likely students were to experience stress, feel overwhelmed by the size of the student body, and experience a dip in grades at ISU. A plausible explanation is that students are able to have more one-on-one interaction with faculty at the community college. Many students are more than likely expecting this same

level of interaction with faculty at the university. The decrease in the level of faculty interaction could possibly impact the level of self-efficacy, which will be discussed later in this chapter. The above findings support current literature, which identifies mentors as having the greatest effect on whether women choose to leave or continue in the science field (Subramaniam & Wyer, 1998).

Although the female students in the qualitative interviews did not elaborate on the role of the community college faculty in their experiences, they did assert that the faculty were friendly, approachable, and helpful in their overall experiences. Although the literature supports the notion of mentor relationships as essential components in the socialization process, it is also noteworthy to mention the impact of the nature of the relationships. The quality of the student–faculty interaction is essential in the students’ socialization processes.

#### *Social Adjustment*

Social adjustment refers to the students’ ability to make friends and become involved in social activities and organizations. Parental household income was a negative predictor of social adjustment, indicating that the higher the parental income level, the more likely students are to have a negative social adjustment. A possible explanation is that students who have a higher parental income level are not limited to campus activities and opportunities. A higher income level allows students the opportunity to be exposed to opportunities outside of the academic environment. Therefore, financial reasons for attending were a positive predictor of social adjustment. In other words, students who receive financial aid packages and consider the cost of the institution when applying for admission are more likely to have a positive social adjustment.

Additionally, students who consult their academic advisor regarding courses and career plans and participate in classroom activities and class discussions are more likely to have a positive social adjustment. Students who meet with their academic advisor regularly are aware of plans and courses and can spend their additional time in social activities. Additionally, students who are engaged in classroom activities may have an easier time making friends and may appear to be more approachable than students who are not as engaged in class.

### *University*

Adjustment can be overwhelming for any student and more so for transfer students. In addition to community colleges, 4-year institutions are also viewed as responsible for student success, transition, and adjustment to 4-year institutions (Berger & Malaney, 2003). The transfer process and how students view themselves as transfer students are significant predictors of both academic and social adjustment. The transfer process is a very critical point in the adjustment process. The results of this study indicated that the more students research and visit prospective campuses and view themselves as a part of the university, the more likely they are to have a positive academic and social adjustment. It is necessary that students be encouraged to do their research regarding prospective 4-year institutions and become aware of the culture of the environment as well as institutional- and academic major-related expectations. It is also essential that transfer students are welcomed into the 4-year environment. Students who feel that their abilities are comparable to nontransfer students and that they are a part of the 4-year environment are more likely to have a positive academic and social adjustment.

During the interviews, the female students viewed themselves as contributors to the 4-year environment and did not view themselves or their abilities as being inferior as a result of being a transfer student. These findings regarding self-efficacy differed from previous studies, which reported that science and math abilities of female students were lower than that of their male counterparts and that female students viewed their abilities as inferior to their male counterparts. The findings from the female students in the qualitative interviews revealed that they were not intimidated by the misperception of the incompetence of women in STEM nor were they intimidated by being a transfer student. Moreover, the female transfer students expressed feeling they had an obligation to excel in math- and science-based areas essentially because they were female. It was evident that the female transfer students viewed “being female” as a reason to excel, rather than an excuse not to excel.

### *Involvement*

Astin (1984) drew attention to the level of involvement both inside and outside of the classroom. The level of involvement, both at the community college and university, among the female participants in this study was very evident among students, more specifically, the female transfer students. The level of involvement in clubs and organizations was very common among the female community college transfer students. In the interviews the students discussed being involved in both the community college environment as well as the university environment. The organizations ranged from major specific organizations to Phi Theta Kappa, which is an honor society at the community college. It is essential to take into account the additional responsibilities of students regarding the level of involvement within the academic involvement. While not a significant component of academic and social adjustment, the majority of both female and male students participated in the transfer student

orientation and expressed that it was somewhat helpful in the transfer process. Nontraditional students are more likely to not be as involved in the academic environment as are the traditional-age students. Although the literature indicates that the level of involvement is essential to the level of adjustment, it is also essential to consider what level of involvement is reasonable for nontraditional and traditional-age students.

### Conclusion

The purpose of this study was to examine the social and academic socialization experiences of community college transfer students in STEM majors. The results of this study suggest that there is an association between background characteristics and experiences and between community college and university experiences and the overall adjustment of transfer students, more specifically, female transfer students in STEM majors.

This study builds on previous research regarding the experiences of transfer students. Much of the current research, conducted by Laanan (2003, 2004), Tsapogas (2004), Townsend (1995), and Townsend and Wilson (2006), highlighted the transfer and adjustment experiences of community college transfer students in STEM majors. More specifically, Laanan (2003) focused on the academic, social, and psychological adjustment experiences of transfer students. Understanding the socialization experiences of community college transfer students is essential in increasing the representation of individuals in STEM majors. None of the students in the qualitative portion of the study reported noticing any type of discrimination or feeling inferior to males in the classroom environment or at the academic institutions. One plausible explanation is that the support systems from family, instructors, faculty, and advisors and the level of involvement among the students allowed them to feel comfortable and confident. It is also interesting that all the students in the interviews reported

early exposure to STEM fields, which Weidman (1987) refers to as precollegiate experiences.

Although female students are entering post-secondary education environments with previous science and mathematical knowledge and experiences and are academically prepared in these areas, the role of faculty and academic advisors are extremely important in the adjustment process. Additionally, the continued encouragement of female students to participate in classroom environments and become involved in campus organizations is essential to their overall positive adjustment and socialization process. Encouraging students to interact with faculty at the university and transfer as many courses as possible is also important during the adjustment process. Additionally, assisting students in researching prospective institutions during the transfer process and understanding their value to the university is vital in the academic and social adjustment process.

#### Implications for Policy and Practice

Understanding gender differences among community college transfer students, the factors that predict social and academic adjustment, and the ways that female community college transfer students describe their socialization experiences is essential in increasing the representation of these individuals pursuing STEM areas of study. The findings of this study provide various implications for policy and practice. This study contributes to the existing literature on the socialization of undergraduate students, community college transfers, and women in STEM by taking a closer look at the factors that influence academic and social adjustment among transfer students. These findings also illuminate ways that female transfer students describe their socialization experiences.



It is very clear that aspirations to pursue STEM areas of study begin at home. Parents are key components in the aspiration of students to pursue STEM majors. The quantitative and qualitative results draw attention to the influences of family in a student's decision to pursue a STEM area of study. However, regardless of where the student is, in terms of major choice, after graduating from high school, postsecondary institutions have an obligation to reach out, encourage, and motivate students to consider STEM majors. As mentioned early in chapter 1, the undergraduate level is acknowledged to be the "latest point" for students to enter into a science area of study (Xie & Shauman, 2003) and is central when attempting to understand and influence gender imbalances in the "male dominated" areas (Sonnert et al., 2007).

### *Community Colleges*

As suggested by the community college transfer students, two initiatives that community colleges and universities could consider would be to:

1. Encourage involvement at the community college and at the university.  
Encourage students to become involved in social activities and in classroom activities.
2. Form collaborative and communication efforts among universities and community college. Help students, advisors and faculty to understand what courses are needed for the overall academic preparation and which classes will transfer to the university.

Six initiatives that community colleges could consider would be to:

1. Hold students accountable for their own learning at the community college.

2. Assess the rigor of the math and science courses at the community college to ensure that students are academically prepared.
3. Encourage classroom participation and involvement.
4. Encourage balance. Although it is important for students to be academically prepared, it is also important for students to become involved in social activities where they are able to meet people and form friendships.
5. Encourage students to take as many math and science courses as possible.
6. Encouraging students to form relationships with faculty at the community college and university.

### *Universities*

It is essential that the social and academic adjustment of community college transfer students in STEM fields is successful. The general perception of faculty and student services, as well as the general perception of transfer students (negative) and financial influential reasons for attending ISU, influence the social and psychological adjustment of transfer students.

The results from this study yield the following initiatives that universities should consider:

1. Help transfer students feel welcomed and as though they are an essential part of the university environment.
2. Reach out to transfer students.
3. Given the financial reasons that some students attend ISU, it is extremely important to offer financial packages to prospective female students.

Gender was a predictor of academic adjustment. It is essential that gender differences be highlighted in order to examine the difference factors that influence the academic and social adjustment of female students. For female community college transfer students the following initiatives are put forth:

1. Early exposure to math and science related areas are essential.
2. Support systems that include family, faculty and advisors are necessary.
3. Academic math and science preparation is important.
4. Encouragement and motivation is needed. The GPAs and math and science course-taking patterns is comparative if not better than their male counterparts.
5. Faculty interaction with female students is important.
6. Community college faculty and advisors should provide students with the needed information regarding transfer and also assist in relieving their anxiety regarding the transfer process.

### Applications of the Study

The findings of this study can be useful to student affairs professionals and faculty, retention programs, financial aid officers, student groups, as well as admission counselors at the community college and university. Additionally, the findings of this study are useful to transfer counselors at community colleges.

Students rely on academic advisors for courses and transfer requirements. Additionally, students look to academic advisors to provide them with information needed for transfer. Moreover, the faculty members play an essential role in how transfer students view their academic journey inside and outside of the classroom. Additionally, faculty play

an important role in whether or not students will continue to the 4-year institution. In return, the receiving university is looked upon for a smooth transfer.

Understanding the socialization process that students have at the community college will help the receiving institution to understand how best to respond to the needs of the transfer students. Additionally, this knowledge will serve as a basis for developing initiatives and programs to best serve the needs of the prospective transfer students.

#### Recommendations for Future Research

Socialization is the way in which individuals learn the norms of a particular population. Understanding the socialization of community college transfer students is essential in increasing the representation of domestic individuals in STEM areas of study. This increase will respond to the workforce that is needed by 2020. The need to turn to community colleges for this increase is even more essential. President Obama has recognized this need and is assisting in providing the necessary resources to ensure that a necessary part of society is not omitted by having begun their educational journey at a community college. In order to further understand the socialization of not only women but all community college transfer students, longitudinal studies should be considered that follow students from early grade school throughout their postsecondary education. Additionally, qualitative information is needed at every stage of students' socialization to understand how they are interpreting their socialization. Understanding this interpretation early in the socialization process will allow for the highlighting of success factors as well as adjustments that may need to be made. It is also beneficial to conduct studies on past community college transfer students who are currently in a STEM career to assess their early socialization processes.

Qualitative research on STEM and non-STEM students is necessary in understanding the socialization similarities and differences among these two groups. It is also noteworthy to consider the role of race, ethnicity, and gender in socialization processes. The findings represent the experiences of White traditional-age students. The experiences of students of color as well as male students may differ. Studies that focus primarily on the socialization of students of color will provide implications that will be relevant to students of specific demographics and characteristics.

Although Weidman's (1987) undergraduate framework took into account the experiences of women, it is essential that studies that utilize feminist theories be conducted to further understand the socialization experiences of females in STEM majors. Feminist perspectives emerged out of the concern of the invisibility of women in society. Feminist scholarship presents ideas from a woman's perspective and takes into account the experiences of women as they engage with the world. Feminist traditions highlight women as the focus of inquiry. Feminist researchers believe that women experience life different from men and therefore women's perceptions and interpretations of certain events are filtered through this "feminist" way of thinking and behaving. Many feminists assert that in this masculine way of normality, female differences and experiences are "rarely acknowledged in different walks of life" (Prasad, 2005, p.161). Feminist perspectives acknowledge the experiences of women and challenge the idea of masculine ways and experiences as being socially accepted standards (Prasad). Using the feminist perspective in this study provides a lens for viewing gender as an essential component that not only shapes the lives of individuals experiencing it but also provides the lens from which individual experiences

occur (Reinharz, 1992). It is extremely important for student affairs professionals to recognize the role of race, ethnicity and gender in the socialization process.

Studies should also be conducted that taken into account the different majors and traditional/nontraditional student status. The experiences of transfer students in engineering may vary from the experiences of students in the physical sciences and agriculture majors. The socialization experiences and the level of involvement among students are likely to differ based on academic majors and by age groups. In addition to the Committee on Prospering in the Global Economy of the 21st Century (2005) and NSF (2007), Tsapogas (2004) highlighted the two most important reasons that students attend community colleges: “to complete credits toward a bachelor’s degree (74 percent) and to gain further skills and knowledge in an academic or occupational field (50 percent),” (p. 2). The essential role of community colleges in preparing students in their pursuit toward a baccalaureate degree and in preparing scientists and engineers is of grave importance in securing the future of the nation’s economy.

#### Final Thoughts

Community colleges are recognized as the leader in workforce preparation. Understanding the socialization experiences of community college transfer students pursuing STEM majors is essential in identifying ways to close the gap that currently hinders the United States from being the leader in preparing individuals in STEM-related areas. As stated previously: “An understanding of the socialization process is vital to all person involved in postsecondary education, for it is the socialization process that allows education to achieve its goals” (Bragg, 1976).

## APPENDIX A. SURVEY INSTRUMENT

**Iowa State University  
Transfer Student Survey**

Thank you for your willingness to complete this survey.

Please answer the following questions based on your experience as a transfer student at Iowa State University. All information you provide will be kept completely confidential and will be used in summary to assist ISU administrators, faculty members, and student affairs professionals in developing resources and programs that will benefit transfer students. Your name will not be associated with your responses in any part of the reporting process.

- The survey is divided into six short sections.
- Scroll through each section to answer the questions.

If you submit your completed survey by April 22, 2009, you will be entered into a drawing to win one of thirty (30) ISU bookstore gift certificates worth \$25.

If you have any difficulty with this survey, please contact Carlos Lopez by email: [clopez@iastate.edu](mailto:clopez@iastate.edu) or by telephone: 515-294-0598.

**Background Information**

First, please complete the following background questions.

**Current place of residence (during academic year).**

- ☐ Residence hall or other university housing
- ☐ Fraternity or sorority house
- ☐ Private apartment or room within walking distance of the university
- ☐ House, apartment, etc. (not walking distance from campus)
- ☐ with parents or relatives

**What is the highest academic degree that you intend to obtain at any college?**

- ☐ Bachelor (BA or BS)
- ☐ Master (MA or MS)

Doctorate (Ph.D. or Ed.D.)

☐ Medical (MD, DDS, DO, or DVM)

☐ Law (JD or LLB)

☐ Other

**At Iowa State University?**

☐ Bachelor (BA or BS)

☐ Master (MA or MS)

☐ Doctorate (Ph.D. or Ed.D.)

☐ Other

**What is the highest level of education completed by your parents?**

	Elementary school or less	Some High School	High School graduate	Some college	Associate's degree from two year	Bachelor's degree	Some graduate school	Graduate degree	Don't know
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**What is your best estimate of your parents' total household income last year?**

☐ If you are independent check here

☐ Less than \$20,000

☐ \$20,000-\$39,999

☐ \$40,000-\$59,999

☐ \$60,000-\$79,999

☐ \$80,000 or more

**Gender**

☐ Female

☐ Male

**What is your age?**



**What is your ethnic background? (you may select more than one answer)**

- ☐ African American or Black
- ☐ Asian American/Pacific Islander
- ☐ Hispanic or Latino/a
- ☐ Native American or Alaskan Native
- ☐ White (non-Hispanic)
- ☐ Other

### **Community College Experiences**

The purpose of this section is to obtain information about your community college experiences prior to your transfer to ISU.

**About how many hours a week did you usually spend on the community college campus, not counting time attending classes?**

- ☐ None
- ☐ 1 to 3 hours
- ☐ 4 to 6 hours
- ☐ 7 to 9 hours
- ☐ 10 to 12 hours
- ☐ more than 12 hours

**About how many hours a week did you usually spend studying or preparing for your classes?**

- ☐ 1 to 5 hours
- ☐ 6 to 10 hours
- ☐ 11 to 15 hours
- ☐ 16 to 20 hours
- ☐ more than 20 hours

**During your time at the community college, about how many hours a week did you usually spend working on a job for pay?**

- ☐ None, I didn't have a job

- ☐ 1-10 hours  
☐ 11-15 hours  
☐ 16-20 hours  
☐ 21-30 hours  
☐ more than 30 hours

**What type of degree, diploma or certificate did you receive? If multiple, please list each in 'Other'.**

- ☐ None  
☐ AA (Associate of Arts)  
☐ AS (Associate of Science)  
☐ AGS (Associate of General Studies)  
☐ AAA (Associate of Applied Arts)  
☐ AAS (Associate of Applied Science)  
☐ Diploma  
☐ Certificate  
☐ Other

### General Courses

The following questions addresses various aspects of your community college experience. For each item below, please indicate the extent to which you disagree or agree with the statement.

		Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
The courses developed my critical and analytical thinking.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The courses demanded intensive writing assignments and projects.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, the courses were intellectually challenging.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The courses prepared me for the academic standards at ISU.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The courses prepared me for my major at ISU.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The courses required extensive reading and writing.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Academic Advising/Counseling Services

The following items address your use of academic advising/counseling services at your community college. Please indicate the extent to which you disagree or agree with each statement

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I consulted with academic advisors/counselors regarding transfer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information received from academic advisors/counselors was helpful in the transfer process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I met with academic advisors/counselors on a regular basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I talked with an advisor/counselor about courses to take, requirements, education plans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I discussed my plans for transferring to a four-year college or university with an academic advisor/counselor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advisors/counselors identified courses needed to meet the general education/major requirements of a four-year college or university I was interested in attending.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Transfer Process

These items pertain to your perceptions about the "transfer process" while you were enrolled at the community college. Please indicate the extent to which you disagree or agree with each statement.

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I researched various aspects of ISU to get a better understanding of the environment and academic expectations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I knew what to expect at ISU in terms of academics.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I visited the ISU campus to learn where offices and departments were located.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I spoke to academic counselors at ISU about transferring and major requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I visited the admission office at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spoke to former community college transfers students to gain insight about their adjustment experiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### College Activities at Your Community College

#### Course Learning

In your experience at your community college, about how often did you do each of the following?

	Never	Occasionally	Often	Very Often
Took detailed notes in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participated in class discussions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tried to see how different facts and ideas fit together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thought about practical applications of the material.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worked on a paper or project where I had to integrate ideas from various sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tried to explain the material to another student or friend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### Experience with Faculty

How often did you do each of the following at your community college?

	Never	Occasionally	Often	Very Often
Visited faculty and sought their advice on class projects such as writing assignments and research papers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt comfortable approaching faculty outside class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked my Instructor for information related to a course I was taking (grades,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Occasionally	Often	Very Often
make-up work, assignments, etc.)				
Visited informally and briefly with an instructor after class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discuss my career plans and ambitions with a faculty member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked my instructor for comments and criticisms about my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Learning and Study Skills

To what extent do you agree or disagree that your academic experiences at your community college gave you the skills you needed to prepare you for the standards and academic rigor at ISU?

	Disagree Strongly	Disagree Somewhat	Neutral	Agree Somewhat	Agree Strongly
Computer skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mathematical skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Note taking skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problem solving skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speaking and oral presentation skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Test taking skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time management skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### ISU Experiences

The purpose of this section is to obtain information about your current experiences at Iowa State University.

About how many hours a week do you usually spend working on a job for pay?

- ☐ None, I don't have a job  
☐ 1 to 10 hours  
☐ 11 to 15 hours  
☐ 16 to 20 hours

21 to 30 hours

☐ more than 30 hours

**What is the most important reason for attending ISU?**

- ☐ To obtain a bachelor's degree  
☐ To gain skills necessary to enter a new job or occupation  
☐ To pursue graduate or professional school  
☐ To satisfy a personal interest (cultural, social)

**Listed below are some reasons that might have influenced your decision to attend ISU. How important was each reason in your decision to come here?**

		Not important	Somewhat Important	Important	Very Important
ISU has a very good academic reputation.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU has a very good reputation for its social activities.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was offered financial assistance.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU has affordable tuition.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic counselor(s) at my previous college advised me.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A friend suggested attending.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A ISU representative recruited me.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU's graduates gain admission to top graduate/professional schools.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU's graduates get good jobs.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU's ranking in national magazines.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parents recommended that I attend ISU.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My brother(s)/sister(s) attended ISU.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenience and location.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Size of ISU.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost of ISU.	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Did you attend a ISU-sponsored Transfer Student Orientation?**

- ☐ Yes  
☐ No

**If you answered yes to the question above, how helpful was the orientation program in facilitating your transition to ISU?**

- ☐ Very unhelpful  
☐ Somewhat unhelpful  
☐ Somewhat helpful  
☐ Very helpful

**College Activities at ISU**

**Course Learning**

**During the past year at ISU, about how often did you do each of the following?**

		Never	Occasionally	Often	Very Often
Took detailed notes in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participated in class discussions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tried to see how different facts and ideas fit together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thought about practical applications of the material.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worked on a paper or project where I had to integrate ideas from various sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tried explain the material to another student or friend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Experience with Faculty**

**During the past year at ISU, about how often did you do each of the following?**

		Never	Occasionally	Often	Very Often
Visited faculty and sought their advice on class projects such as writing assignments and research papers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Occasionally	Often	Very Often
Felt comfortable approaching faculty outside class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked my instructor for information related to a course I was taking (grades, make-up work, assignments, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visited informally and briefly with an instructor after class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussed my career plans and ambitions with a faculty member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked my instructor for comments and criticisms about my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### General Perceptions of ISU

The following are statements about your general perceptions, adjustment process, and opinion of you overall satisfaction at ISU. Please indicate the extent to which you agree or disagree.

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
ISU faculty are easy to approach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU faculty tend to be accessible to students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was difficult learning the "red tape" when I started.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I am a "community college transfer," most students tend to underestimate my abilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because I am a "community college transfer," most faculty tend to underestimate my abilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a stigma at ISU among students for having started at a community college.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
Generally, students are more concerned about "getting the grade" instead of learning the material.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
Many students feel like they do not "fit in" on this campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professors are strongly interested in the academic development of undergraduates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most students are treated like a "number."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student services are responsive to student needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If students expect to benefit from what ISU has to offer, they have to take the initiative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I feel the courses I have taken at ISU have been interesting and worthwhile.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ISU is an intellectually stimulating and often exciting place to be.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend to other transfer students to come to ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I could start over again, I still would go to ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Adjustment Process</b>				
Please indicate the extent to which you agree or disagree with the following statements.				
	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
Adjusting to the academic standards or expectations at ISU has been easy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adjusting to the social environment at ISU has been easy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often feel (felt) overwhelmed by the size of the student body.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upon transferring I felt alienated at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very involved with social activities at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
I am meeting as many people and making as many friends as I would like at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The large classes intimidate me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy to find my way around campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My level of stress increased when I started ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I experienced a dip in grades (GPA) during my first semester at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
It is easy to make friends at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable spending time with friends that I made at the community college I attended.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more comfortable making friends with transfer students than non-transfers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a sense of competition between/among students at ISU that is not found in community colleges.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### College Satisfaction

Please rate your satisfaction with each of the aspects of campus life listed below.

	Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Not Applicable
Sense of belonging at ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decision to transfer to ISU.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality of instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of community on campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic advising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Career counseling and advising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student housing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Courses in your major field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Not Applicable
Amount of contact with faculty.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunities for community service.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job placement services for students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Class Size.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interaction with other students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethnic/racial diversity of the faculty.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leadership opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall college experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Conclusion**  
Comments

What factors helped you adjust to ISU? Please explain what factors contributed to your successful transfer (or unsuccessful transfer) to ISU. Feel free to include factors at both your community college and ISU.

What might the community college have done to enhance your success or ease the transition to ISU?

If you could give some advice to community college students who will be transferring to ISU, what would that advice be?

**What have we NOT asked that you would like us to know about your experiences at the community college or ISU?**

### **Interview and/or Focus Group Participation**

**We would like to solicit your participation in an interview and/or focus group to obtain in-depth information about your overall educational experiences. The interview and/or focus group will last 1.5 hours. If you are interested in participating, please provide the following information.**

First Name

Last Name

Best number to call

E-Mail

**If you participate in the focus group, please be advised that you responses will remain "CONFIDENTIAL." Findings will be reported in the aggregate and no personal identifiable information will be associated with your responses.**

**If you have any questions about the survey, please contact Carlos Lopez by email: [clopez@iastate.edu](mailto:clopez@iastate.edu) or by telephone: 515-294-0598.**

### **Thank you**

**Thank you very much for taking the time to complete this Transfer Student Survey. The Iowa State University administration greatly appreciates your contributions toward improving the university academic environment.**

**Frankie Santos Laanan, Ph.D.  
Associate Professor, Educational Leadership and Policy Studies.**

## APPENDIX B. CORRESPONDENCE WITH PARTICIPANTS

### E-mail Letter to Participants

Dear

We are conducting a study that focuses on the experiences of transfer students at Iowa State University. This research study consists of a brief web survey that asks about the academic and social experiences of transfer students both at their community college and at ISU. The main objective is to learn how well ISU and Iowa community colleges are meeting the needs of transfer students.

As a recent transfer student, you have been selected to participate in this study. I know that this is a busy time of year, but please take about ten minutes to answer the questions on this web survey. This is your opportunity to help us anticipate the needs of future transfer students and to help us serve you better during the rest of your time at ISU.

To thank you for your time and assistance, you will have a chance to win one of 10 gift certificates worth \$25.00 to the University Book Store. Submit your completed survey on or before and you will be automatically entered into a lottery for a random drawing. If you are selected as one of the winners in the lottery, you will be required to sign a receipt documenting receipt of the gift certificate.

Your participation in this study is voluntary, and your willingness to participate will have no effect on your ISU status. Your responses will remain completely confidential and secured and your name will never be associated with the answers you provide. Also, to ensure confidentiality, the data collected from the research study will be stored on a password protected computer and in a locked office.

To access the survey, you must follow the instructions below:

When you click on the above link, you will be automatically logged onto the survey. Your participation is voluntary and you may skip any questions you don't want to answer. Your responses will only be publicly reported as group data (e.g., "20% of sophomores said...").

At the close of study, all unique identification (your email address) will be deleted, and your responses will be stored in a password protected computer file. The ISU Human Subjects Research Office has approved this research study and survey.

### **CONFIDENTIALITY**

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect

## E-mail Follow-Up Letter

Dear

As a friendly reminder, we are conducting a study that focuses on the experiences of transfer students at Iowa State University. This research study consists of a brief web survey that asks about the academic and social experiences of transfer students both at their community college and at ISU. The main objective is to learn how well ISU and Iowa community colleges are meeting the needs of transfer students. The results from this study will assist Iowa State University and Community with information that is essential to the continued success of providing resources to community college transfer students.

As a recent transfer student, you have been selected to participate in this study. I know that this is a busy time of year, but please take about ten minutes to answer the questions on this web survey. The survey will take approximately 15-20 minutes to complete. This is your opportunity to help us anticipate the needs of future transfer students and to help us serve you better during the rest of your time at ISU.

To thank you for your time and assistance, you will have a chance to win one of 10 gift certificates worth \$25.00 to the University Book Store. Submit your completed survey on or before and you will be automatically entered into a lottery for a random drawing. If you are selected as one of the winners in the lottery, you will be required to sign a receipt documenting receipt of the gift certificate.

Your participation in this study is voluntary, and your willingness to participate will have no effect on your ISU status. Your responses will remain completely confidential and secured and your name will never be associated with the answers you provide. Also, to ensure confidentiality, the data collected from the research study will be stored on a password protected computer and in a locked office.

There are no foreseeable risks at this time from participating in this study.

If you decide to participate in a one-hour focus group, the benefit will be that you will have the opportunity to further provide useful input that will aid in ensuring a successful experience for future transfer students.

To access the survey, you must follow the instructions below:

When you click on the above link, you will be automatically logged onto the survey. Your participation is voluntary and you may skip any questions you don't want to answer. Your responses will only be publicly reported as group data (e.g., "20% of sophomores said...").

At the close of study, all unique identification (your email address) will be deleted, and your responses will be stored in a password protected computer file. The ISU Human Subjects Research Office has approved this research study and survey.

## APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVAL

**IOWA STATE UNIVERSITY**  
 OF SCIENCE AND TECHNOLOGY

 Institutional Review Board  
 Office for Responsible Research  
 Vice President for Research  
 1138 Pearson Hall  
 Ames, Iowa 50011-2207  
 515 294-4566  
 FAX 515 294-4267

**DATE:** January 13, 2010

**TO:** Frankie Santos Laanan  
N225A Lagomarcino

**FROM:** Office for Responsible Research

**TITLE:** Study of Transfer Students at Iowa State University

**IRB ID:** 08-541

Approval Date: 11 January 2010

Date for Continuing Review: 25 February 2010

Submission Type: ModificationReview Type: Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University. Please refer to the IRB ID number shown above in all correspondence regarding this study.

Your study has been approved according to the dates shown above. To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, including the **recruitment materials and informed consent documents that have the IRB approval stamp.**
- **Obtain IRB approval prior to implementing any changes** to the study by submitting the "Continuing Review and/or Modification" form.
- **Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences** involving risks to subjects or others; and **(2) any other unanticipated problems involving risks** to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office for Responsible Research website [[www.compliance.iastate.edu](http://www.compliance.iastate.edu)] or available by calling (515) 294-4566.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

APPENDIX D. *T* TESTS**Gender Analysis***Community College Experiences**T* Test for Community College Transfer Semester Credit Hours

## Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community college transfer	0	99	63.46	27.002	2.714
semester credit hours	1	221	57.99	18.491	1.244

## Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.141	.707	2.107	318	.036	5.473	2.597	.0363	10.583
Equal variances not assumed			1.833	140.733	.069	5.473	2.985	..429	11.375



*T* test for Community College Transfer Semester GPA

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Transfer Semester GPA	0	99	3.31	.48400	.04864
	1	221	3.16	.51145	.03440

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	1.335	.249	2.557	318	.011	.15558	.06085	.03586	.27530
Equal variances not assumed			2.611	198.447	.010	.15558	.05958	.03809	.27307

*T* test for Community College Academic Advising

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Academic Advising	0	89	3.0337	.93480	.09909
	1	199	3.0251	.90139	.06390

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.135	.713	.074	286	.941	.00858	-.11627	-.22027	.23744
Equal variances not assumed			.073	163.814	.942	.00858	.11790	-.22423	.24139

*T* test for Community College Experience with Faculty

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Experience with Faculty	0	86	3.0814	.75483	.08140
	1	200	2.9450	.79696	.05635

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.021	.884	1.348	284	.179	.13640	.10117	-.06275	.33554
Equal variances not assumed			1.378	169.394	.170	.13640	.09900	-.05904	.33183

*T* test for Community College Course Learning

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Course Learning	0	84	3.5000	.54882	.05988
	1	198	3.3030	.64445	.04580

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.440	.508	2.449	280	.015	1.9697	.08043	.03865	.35529
Equal variances not assumed			2.613	182.234	.010	.19697	.07539	.04822	.34572

*T* test for Community College General Courses

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College General Courses	0	91	3.1978	.67032	.07027
	1	201	3.1493	.69109	.04875

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.058	.810	.561	290	.575	.04855	.08651	-.12172	.21882
Equal variances not assumed			.568	178.829	.571	.04855	.08552	-.12021	.21731

*T* test for Community College Transfer Process

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Transfer Process	0	90	3.1667	.76804	.08096
	1	204	3.0784	.70447	.04932

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	4.378	.037	.963	292	.337	.08824	.09167	-.09219	.26866
Equal variances not assumed			.931	157.798	.353	.08824	.09480	-.09901	.27548

*T* test for Community College Hours Spent Studying and Preparing for Class

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Community College Hours Spent Studying and Preparing for Class	0	91	1.87	.921	.097
	1	205	1.86	1.116	.078

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	2.933	.088	.035	294	.972	.005	.134	-.258	.268
Equal variances not assumed			.038	206.738	.970	.005	.124	-.240	.249

*University Experiences**T test for ISU GPA (as of Fall 2009)*

## Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
ISU GPA (as of Fall 2009)	0	80	3.0160	.74036	.08277
	1	182	2.8267	.90048	.06675

## Independent Samples Test

	Levene's test of equality of variances		<i>T test for equality of means</i>						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	5.455	.020	1.650	260	.100	.18930	.11469	-.03655	.41514
Equal variances not assumed			1.780	181.626	.077	.18930	.10633	-.02051	.39911



*T* test for ISU General Perception of Experience with Faculty

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
ISU General Perception of Experience with Faculty	0	80	2.7375	.80730	.09026
	1	192	2.6302	.80165	.05785

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.186	.667	1.004	270	.316	.10729	.10690	-.10317	.31775
Equal variances not assumed			1.001	146.987	.319	.10729	.10721	-.10458	.31916

*T* test for ISU General Perception of Course Learning

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
General Perception of Course Learning	0	80	3.4500	.61418	.06867
	1	191	3.3979	.65598	.04747

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.378	.539	.607	269	.544	.05209	.08576	-.11676	.22095
Equal variances not assumed			.624	157.571	.533	.05209	.08348	-.11278	.21697

*T* test for ISU General Perception of Transfer Student (Negative)

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
General Perception of Transfer Student (Negative)	0	80	2.8000	.71865	.08035
	1	190	2.8684	.67342	.04886

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.961	.328	-.747	268	.456	-.06842	.09157	-.24871	.11187
Equal variances not assumed			-.728	140.204	.468	-.06842	.09403	-.25433	.11749

*T* test for Influential Reason for Attending ISU: Reputation

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Influential Reason for Attending ISU:	0	87	3.0115	.78495	.08416
Reputation	1	199	3.0503	.81494	.05777

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.875	.350	-.374	284	.709	-.03876	.10359	-.24266	.16515
Equal variances not assumed			-.380	169.774	.705	-.03876	.10208	-.24026	.16274

*T* test for Influential Reason for Attending ISU: Financial

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Influential Reason for Attending ISU:	0	85	3.2118	.81787	.08871
Financial	1	196	2.8163	.95277	.06813

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	1.993	.159	3.328	279	.001	.39544	.11883	.16152	.62936
Equal variances not assumed			3.535	184.635	.001	.39544	.11185	.17477	.61611

*T* test for Influential Reason for Attending ISU:  
Community College Advisor, Friend, ISU Advisor

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Influential Reason for Attending ISU:	0	85	2.0471	.82960	.08998
Community College Advisor, Friend, ISU Advisor	1	198	2.0404	.80505	.05721

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	.031	.860	.063	281	.950	.00665	.10536	-.20073	.21404
Equal variances not assumed			.062	154.853	.950	.00665	.10663	-.20398	.21729

*T* test for General Perception of Courses and Campus

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
Overall Satisfaction	0	81	3.4198	.70470	.07930
	1	190	3.5526	.55860	.04052

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	5.464	.020	-1.653	269	.099	-.13288	.08038	-.29113	.02538
Equal variances not assumed			-1.507	124.808	.134	-.13288	.08817	-.30737	.04161

*T* test for General Perception of Faculty and Student Services

Gender Group Statistics

	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	Std. error mean
General Perception of Faculty	0	79	3.2532	.70653	.07949
	1	188	3.1489	.66151	.04825

Independent Samples Test

	Levene's test of equality of variances		<i>T</i> test for equality of means						
	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
								Lower	Upper
Equal variances assumed	1.793	.182	1.152	265	.251	.10423	.09051	-.07399	.28245
Equal variances not assumed			1.121	138.225	.264	.10423	.09299	-.07963	.28809



## APPENDIX E. MODEL SUMMARY

## Hierarchical Regression Models

## Academic Adjustment

Model	$R$	$R^2$	Adjusted $R^2$	Std. error of the estimate	Change Statistics				
					$R^2$ change	$F$ change	df1	df2	Sig. $F$ change
1	.162 <sup>a</sup>	.026	.014	.68434	.026	2.141	3	237	.096
2	.369 <sup>b</sup>	.136	.091	.65713	.110	3.226	9	228	.001
3	.538 <sup>c</sup>	.290	.243	.59983	.154	16.214	3	225	.000

## Social Adjustment

Model	$R$	$R^2$	Adjusted $R^2$	Std. error of the estimate	Change Statistics				
					$R^2$ change	$F$ change	df1	df2	Sig. $F$ change
1	.150 <sup>a</sup>	.023	.003	.40049	.023	1.128	4	195	.345
2	.388 <sup>b</sup>	.151	.115	.37723	.128	7.198	4	191	.000
3	.496 <sup>c</sup>	.246	.184	.36222	.095	3.307	7	184	.002

## APPENDIX F: CORRELATION MATRICES

# Academic Adjustment Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Academic adjustment	1.000	.068	-.116	-.118	.139	-.022	.069	.037	.157	.245	-.003	-.028	-.126	-.038	-.298	.428	.043
2. Highest level of education completed by your Father	.068	1.000	.041	-.036	.106	-.006	-.091	.008	.015	-.154	-.009	-.052	.041	-.042	-.038	.005	.022
3. Gender	-.116	.041	1.000	-.145	-.069	-.120	-.251	.003	-.019	-.020	-.146	-.088	-.020	-.197	-.198	.033	-.104
4. Highest academic degree you intend to obtain at any college	-.118	-.036	-.145	1.000	.000	.051	.019	-.014	-.005	-.017	.141	-.040	-.026	.026	.125	-.023	-.004
5. Transfer semester GPA	.139	.106	-.069	.000	1.000	.177	.106	.115	.151	.144	.278	.065	.027	.039	-.064	.090	-.037
6. Transfer semester hours	-.022	-.006	-.120	.051	.177	1.000	.418	.123	.127	.282	.167	.021	.004	.003	.019	.015	.016
7. Associates degree obtained	.069	-.091	-.251	.019	.106	.418	1.000	.002	.043	.114	.017	.024	-.023	.094	.121	.003	.191
8. Hours a week spent studying or preparing for your classes	.037	.008	.003	-.014	.115	.123	.002	1.000	.139	.196	.390	.396	.277	.117	-.037	.093	-.115
9. CC Academic advising	.157	.015	-.019	-.005	.151	.127	.043	.139	1.000	.402	.190	.122	.124	.020	.034	.052	.093
10. CC experience faculty	.245	-.154	-.020	-.017	.144	.282	.114	.196	.402	1.000	.449	.299	.015	.005	-.100	.213	.073
11. CC course learning	-.003	-.009	-.146	.141	.278	.167	.017	.390	.190	.449	1.000	.367	.059	.109	.010	-.001	-.054
12. CC general courses	-.028	-.052	-.088	-.040	.065	.021	.024	.396	.122	.299	.367	1.000	.133	.139	.127	.008	.069
13. CC transfer process	-.126	.041	-.020	-.026	.027	.004	-.023	.277	.124	.015	.059	.133	1.000	.200	.183	.020	-.007

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
14. ISU financial reasons for attending	-.038	-.042	-.197	.026	.039	.003	.094	.117	.020	.005	.109	.139	.200	1.000	.123	.028	.076
15. general perception of faculty	-.298	-.038	-.198	.125	-.064	.019	.121	-.037	.034	-.100	.010	.127	.183	.123	1.000	-.343	.048
16. ISU general perception negative experiences of transfer student	.428	.005	.033	-.023	.090	.015	.003	.093	.052	.213	-.001	.008	.020	.028	-.343	1.000	-.011
17. ISU cumulative GPA (FALL 2009)	.043	.022	-.104	-.004	-.037	.016	.191	-.115	.093	.073	-.054	.069	-.007	.076	.048	-.011	1.000
1. Academic adjustment	.	.169	.052	.049	.025	.377	.169	.302	.014	.000	.482	.347	.039	.295	.000	.000	.273
2. Highest level of education completed by your Father	.169	.	.282	.305	.068	.465	.102	.453	.416	.015	.450	.234	.284	.278	.298	.471	.380
3. Gender	.052	.282	.	.021	.167	.046	.000	.485	.394	.393	.020	.109	.390	.003	.003	.320	.073
4. Highest academic degree you intend to obtain at any college	.049	.305	.021	.	.496	.236	.397	.423	.475	.406	.023	.289	.359	.357	.040	.372	.477
5. Transfer semester GPA	.025	.068	.167	.496	.	.006	.068	.053	.017	.021	.000	.180	.351	.295	.184	.104	.304
6. Transfer semester hours	.377	.465	.046	.236	.006	.	.000	.042	.037	.000	.009	.384	.478	.485	.395	.417	.412
7. Associates degree obtained	.169	.102	.000	.397	.068	.000	.	.488	.273	.055	.407	.367	.375	.093	.045	.481	.004
8. Hours a week spent studying or preparing for your classes	.302	.453	.485	.423	.053	.042	.488	.	.025	.003	.000	.000	.000	.051	.301	.095	.053
9. CC Academic advising	.014	.416	.394	.475	.017	.037	.273	.025	.	.000	.004	.043	.041	.391	.318	.234	.095
10. CC experience faculty	.000	.015	.393	.406	.021	.000	.055	.003	.000	.	.000	.000	.415	.473	.080	.001	.155

Sig. (1-tailed)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
11. CC course learning	.482	.450	.020	.023	.000	.009	.407	.000	.004	.000	.	.000	.204	.064	.447	.494	.225
12. CC general courses	.347	.234	.109	.289	.180	.384	.367	.000	.043	.000	.000	.	.030	.025	.037	.457	.167
13. CC transfer process	.039	.284	.390	.359	.351	.478	.375	.000	.041	.415	.204	.030	.	.002	.005	.391	.461
14. ISU financial reasons for attending	.295	.278	.003	.357	.295	.485	.093	.051	.391	.473	.064	.025	.002	.	.042	.349	.142
15. general perception of faculty	.000	.298	.003	.040	.184	.395	.045	.301	.318	.080	.447	.037	.005	.042	.	.000	.252
16. ISU general perception negative experiences of transfer student	.000	.471	.320	.372	.104	.417	.481	.095	.234	.001	.494	.457	.391	.349	.000	.	.438
17. ISU cumulative GPA (FALL 2009)	.273	.380	.073	.477	.304	.412	.004	.053	.095	.155	.225	.167	.461	.142	.252	.438	.
1. Academic adjustment	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
2. Highest level of education completed by your Father	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
3. Gender	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
4. Highest academic degree you intend to obtain at any college	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
5. Transfer semester GPA	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
6. Transfer semester hours	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
7. Associates degree obtained	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
8. Hours a week spent studying or preparing for your classes	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
9. CC Academic advising	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
10. CC experience faculty	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
11. CC course learning	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
12. CC general courses	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
13. CC transfer process	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
14. ISU financial reasons for attending	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
15. general perception of faculty	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
16. ISU general perception negative experiences of transfer student	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
17. ISU cumulative GPA (FALL 2009)	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198

# Social Adjustment Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Social adjustment	1.000	-.007	-.145	.011	.035	.007	.151	-.059	.311	.237	.150	.175	.109	-.163	.093
2. Highest level of education completed by your father	-.007	1.000	.152	-.012	.005	.049	-.062	.084	.018	-.028	.093	-.004	-.006	.000	.068
3. Parents' total household income last year	-.145	.152	1.000	.039	-.015	.071	-.046	.063	.031	-.048	.117	-.084	-.044	.075	.112
4. Gender	.011	-.012	.039	1.000	-.056	.043	-.059	-.104	-.107	-.167	.011	-.079	.014	.009	-.053
5. Highest academic degree that you intend to obtain at any college	.035	.005	-.015	-.056	1.000	.008	-.087	.098	-.040	.044	.075	.063	.033	.040	.125
6. Hours a week spent studying or preparing for your classes	.007	.049	.071	.043	.008	1.000	.115	.352	.199	.049	.294	.084	.082	.081	-.012
7. CC academic advising	.151	-.062	-.046	-.059	-.087	.115	1.000	.253	.157	-.011	.060	.096	.031	.034	-.037
8. CC course learning	-.059	.084	.063	-.104	.098	.352	.253	1.000	.106	.132	.255	.020	-.009	.079	.174
9. CC transfer process	.311	.018	.031	-.107	-.040	.199	.157	.106	1.000	.252	.199	.241	.223	-.005	.052
10. ISU financial reasons for attending	.237	-.028	-.048	-.167	.044	.049	-.011	.132	.252	1.000	.102	.134	.192	.070	-.021
11. ISU general perception of course learning	.150	.093	.117	.011	.075	.294	.060	.255	.199	.102	1.000	.464	.234	-.014	.102
12. ISU general perception of faculty	.175	-.004	-.084	-.079	.063	.084	.096	.020	.241	.134	.464	1.000	.293	-.163	.029
13. Overall satisfaction	.109	-.006	-.044	.014	.033	.082	.031	-.009	.223	.192	.234	.293	1.000	-.254	.000
14. ISU general perception: negative experiences of transfer students	-.163	.000	.075	.009	.040	.081	.034	.079	-.005	.070	-.014	-.163	-.254	1.000	.007
15. Experience with faculty	.093	.068	.112	-.053	.125	-.012	-.037	.174	.052	-.021	.102	.029	.000	.007	1.000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Social adjustment	.	.462	.020	.437	.313	.462	.016	.202	.000	.000	.017	.007	.062	.011	.095
2. Highest level of education completed by your father	.462	.	.016	.435	.470	.247	.190	.120	.402	.346	.094	.476	.469	.499	.170
3. Parents' total household income last year	.020	.016	.	.294	.416	.159	.258	.189	.333	.252	.049	.118	.267	.146	.058
4. Gender	.437	.435	.294	.	.217	.274	.202	.072	.066	.009	.441	.132	.421	.449	.227
5. Highest academic degree that you intend to obtain at any college	.313	.470	.416	.217	.	.453	.110	.084	.288	.267	.145	.187	.322	.286	.038
6. Hours a week spent studying or preparing for your classes	.462	.247	.159	.274	.453	.	.052	.000	.002	.243	.000	.119	.124	.128	.433
7. CC academic advising	.016	.190	.258	.202	.110	.052	.	.000	.013	.441	.199	.087	.333	.318	.301
8. CC course learning	.202	.120	.189	.072	.084	.000	.000	.	.068	.031	.000	.388	.448	.134	.007
9. CC transfer process	.000	.402	.333	.066	.288	.002	.013	.068	.	.000	.002	.000	.001	.471	.234
10. ISU financial reasons for attending	.000	.346	.252	.009	.267	.243	.441	.031	.000	.	.076	.029	.003	.161	.383
11. ISU general perception of course learning	.017	.094	.049	.441	.145	.000	.199	.000	.002	.076	.	.000	.000	.423	.075
12. ISU general perception of faculty	.007	.476	.118	.132	.187	.119	.087	.388	.000	.029	.000	.	.000	.011	.344
13. Overall satisfaction	.062	.469	.267	.421	.322	.124	.333	.448	.001	.003	.000	.000	.	.000	.496
14. ISU general perception: negative experiences of transfer students	.011	.499	.146	.449	.286	.128	.318	.134	.471	.161	.423	.011	.000	.	.461
15. Experience with faculty	.095	.170	.058	.227	.038	.433	.301	.007	.234	.383	.075	.344	.496	.461	.

Sig. (1-tailed)



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Social adjustment	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
2. Highest level of education completed by your father	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
3. Parents' total household income last year	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
4. Gender	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
5. Highest academic degree that you intend to obtain at any college	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
6. Hours a week spent studying or preparing for your classes	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
7. CC academic advising	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
8. CC course learning	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
9. CC transfer process	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
10. ISU financial reasons for attending	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
11. ISU general perception of course learning	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
12. ISU general perception of faculty	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
13. Overall satisfaction	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
14. ISU general perception: negative experiences of transfer students	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
15. Experience with faculty	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200

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